ESSENTIALS OF PHARMACY

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WITH QUESTIONS AND ANSWERS

BY

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PREFACE

In offering this volume to students of pharmacy the author is influenced by observations incident to seventeen years of continuous service as instructor in pharmacy at the University of Illinois School of Pharmacy.

It is apparent that a greater number of students will acquire a more accurate knowledge of the subject in the short time allotted to the presentation of this branch, through the medium of questions and answers than by perusal of an exhaustive treatise on pharmacy. Admittedly, cram methods in the study of pharmacy are to be frowned upon, but examination of some of the textbooks reveals such palpable padding with nonessential material, that there seems to be a field for a book which will get away from the ordinary quiz-compend with its lack of correlation of subject matter and the very exhaustive books which best serve as complete reference books on pharmaceutical subjects.

Effort has been made to have the questions follow each other in logical sequence, even to the asking and answering of some questions which might seem to have no relation to pharmacy, but which serve, in a few words, to give the student a better understanding of the terms used.

The subjects are presented in the order originally outlined by the late Professor C. S. N. Hallberg in a course in pharmacy at the University of Illinois School of Pharmacy.

As the matter in this book has for its foundation the requirements of the United States Pharmacopœia and the National Formulary, it must be evident that the student will not make the desired progress without copies of these two standards always at hand.

In compiling these questions and answers the following books have been freely consulted; for the aid therefrom obtained, grateful acknowledgment is made:

The United States Pharmacopœia.
The National Formulary.
Arny's Principles of Pharmacy.
Caspari's Treatise on Pharmacy.
Coblentz's Handbook of Pharmacy.
Fantus' Prescription Writing and Pharmacy.

Culbreth's Materia Medica and Therapeutics.
Gordin's Inorganic Chemistry.
Morris' Essentials of Materia Medica and Therapeutics.
MacEwan's Art of Dispensing.
National Standard Dispensatory.
Perkin and Kipping's Organic Chemistry.
Potter's Therapeutics, Materia Medica, and Pharmacy.
Remington's Practice of Pharmacy.
Ruddiman's Incompatibilities in Prescriptions.
Ruddiman's Whys in Pharmacy.
Scoville's Art of Compounding.
Smith's General Inorganic Chemistry.
Sadtler and Coblentz's Pharmaceutical and Medical Chemistry.
United States Dispensatory.
Wilcox's Materia Medica and Therapeutics.

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CONTENTS

METRIC SYSTEM AND EQUIVALENTS

The fundamental unit of the metric system is the Meter (the unit of length). From this the units of mass (GRAM) and capacity (LITER) are derived. All other units are the decimal subdivisions or multiples of these. These three units are simply related, so that for all practical purposes the volume of one kilogram of water (one liter) is equal to one cubic decimeter.

Prefixes	Meaning		Units
milli = one-thousandth 1/1000		.001	Meter, for length
centi = one-hundredth 1/100		.01	Gram, for weight
deci = one-tenth 1/10		.1	Liter, for volume
unit = one			
Deka = ten 10/1	10.		
Hecto = one hundred 100/1	100.		
Kilo = one thousand 1000/1	1000.		

The metric terms are formed by combining the words METER, LITER, GRAM with these six numerical prefixes.

Length

10 milli-meters (mm.)	=	1 centi-meter	(cm.)
10 centi-meters	=	1 deci-meter	(dm.)
10 deci-meters	=	1 Meter (about 40 inches)	(M.)
10 Meters	=	1 Deka-meter	(Dkm.)
10 Deka-meters	=	1 Hecto-meter	(Hm.)
10 Hecto-meters	=	1 Kilo-meter (about ⅝ mile)	(Km.)

Mass

10 milli-grams (mg.)	=	1 centi-gram	(cg.)
10 centi-grams	=	1 deci-gram	(dg.)
10 deci-grams	=	1 Gram (about 15 grains)	(Gm.)
10 Grams	=	1 Hecto-gram	(Hg.)
10 Deka-grams	=	1 Hecto-gram	(Hg.)
10 Hecto-grams	=	1 Kilo-gram (about 2 pounds)	(Kg.)

Capacity

10 milli-liters (ml)	=	1 centi-liter	(cl.)
10 centi-liters	=	1 deci-liter	(dl.)
10 deci-liters	=	1 Liter (about 1 quart)	(L.)
10 Liters	=	1 Deka-liter	(Dl.)
10 Deka-liters	=	1 Hecto-liter (about 1 barrel)	(Hl.)
10 Hecto-liters	=	1 Kilo-liter	(Kl.)

The square and cubic units are the squares and cubes of the units of the measures of length.

The ordinary unit of land area is the HECTARE which is equal to about 2½ acres.

Equivalents

1 Meter = 39.37 inches. This legal equivalent was adopted by act of Congress, July 28, 1866.

Length

Centimeter	= 0.3937 inch
Meter	= 3.28 feet
Meter	= 1.094 yards
Kilometer	= 0.621 statute mile
Kilometer	= 0.5398 nautical mile

Inch	= 2.540 centimeters
Foot	= 0.395 Meter
Yard	= 0.914 Meter
Statute mile	= 1.61 Kilometers
Nautical mile	= 1.853 Kilometers

Area

Sq. centimeter	= 0.155 sq. inch
Sq. meter	= 10.76 sq. feet
Sq. meter	= 1.196 sq. yards
Hectare	= 2.47 acres
Sq. kilometer	= 0.386 sq. mile
Sq. inch	= 6.45 sq. centimeters
Sq. foot	= 0.0929 sq. meter
Sq. yard	= 0.836 sq. meter
Acre	= 0.405 hectare
Sq. mile	= 2.59 sq. kilometers.

Volume

Cubic centimeter	= 0.0610 cubic inch
Cubic meter	= 35.3 cubic feet
Cubic meter	= 1.308 cubic yards
Cubic inch	= 16.39 cubic centimeters
Cubic foot	= 0.0283 cubic meter
Cubic yard	= 0.765 cubic meter

Capacity

Milliliter	= 0.0338 U. S. liq. ounce
Milliliter	= 0.2705 U. S. apoth. dram
Liter	= 1.057 U. S. liq. quarts
Liter	= 0.2642 U. S. liq. gallon
Liter	= 0.908 U. S. dry quart
Dekaliter	= 1.135 U. S. pecks
Hectoliter	= 2.838 U. S. bushels
U. S. liquid ounce	= 29.57 mils
U. S. apoth. dram	= 3.70 mils
U. S. liquid quart	= 0.946 liter
U. S. dry quart	= 1.101 liter
U. S. liquid gallon	= 3.785 liter
U. S. peck	= 0.881 Dekaliter
U. S. bushel	= 0.3524 Hectoliter

Weight

Gram	= 15.43 grains
Gram	= 0.772 U. S. apoth. scruple
Gram	= 0.2572 U. S. apoth. dram
Gram	= 0.0353 avoir. ounce
Gram	= 0.03215 troy ounce
Kilogram	= 2.205 avoir. pound
Kilogram	= 2.679 troy pound
Metric ton	= 0.984 gross or long ton
Metric ton	= 1.102 short or net tons
Grain	= 0.0648 Grams
U. S. apoth. scruple	= 1.296 Grams
U. S. apoth. dram	= 3.89 Grams
Avoir. ounce	= 28.35 Grams
Troy ounce	= 31.10 Grams
Avoir. pound	= 0.4536 Kilogram
Troy pound	= 0.373 Kilogram
Gross or long ton	= 1.016 metric tons
Short or net ton	= 0.907 metric ton

ESSENTIALS OF PHARMACY

Q.—Define **Pharmacy.**

A.—The science and art of preparing, preserving, compounding, and dispensing medicines.

Q.—What is theoretical pharmacy?

A.—The study and exposition of the principles upon which pharmaceutical operations are based.

Q.—What is practical pharmacy?

A.—Systematic exercises in pharmaceutical operations, which includes primarily the making of preparations of the Pharmacopœia and National Formulary.

Q.—Define dispensing pharmacy.

A.—The extemporaneous preparation or compounding of medicines.

Q.—What is manufacturing pharmacy?

A.—The preparation of pharmaceutical substances.

Q.—What is commercial pharmacy?

A.—The trade or commerce in pharmaceutical products including business practice.

Q.—Define "**Drugs**".

A.—Substances used as medicine or in the preparation of medicines. Drugs which have not been changed by manufacture, except by desiccation and comminution, are "crude" drugs.

Q.—Define **Medicine.**

A.—A drug or preparation of drugs possessing or reputed to possess curative or remedial properties.

Q.—Name the sciences embraced in the study of pharmacy.

A.—Materia medica, botany, posology, toxicology, pharmacodynamics, therapy-dynamics, pharmacognosy, chemistry, assaying, pharmacology, mineralogy.

Q.—Define **Materia Medica.**

A.—The study of the physical, physiological, and therapeutical properties of the materials used for curative or remedial purposes.

Q.—Define **Botany.**
A.—The study of the structure, growth, and classification of plants.

Q.—Define **Posology.**
A.—The study of the dosage of medicines.

Q.—Define **Toxicology.**
A.—The study of poisons, their recognition, effects, and antidotes.

Q.—Define **Pharmaco-dynamics.**
A.—The study of the action of medicines on the healthy organs.

Q.—Define **Therapy-dynamics** (therapeutics).
A.—The study of the action of medicines on the diseased organs.

Q.—Define **Pharmacognosy.**
A.—The study of the identification and selection of crude drugs.

Q.—Define **Histological Pharmacognosy.**
A.—The identification and selection of crude drugs by the use of the microscope.

Q.—Define **Commercial Pharmacognosy.**
A.—The trade and commerce in crude drugs.

Q.—Define **Chemistry.**
A.—The science of the composition of material things and the art of determining such composition.

Q.—Define **General Chemistry.**
A.—The study of the theory and principles of chemistry.

Q.—What is **Pharmaceutical Chemistry?**
A.—The chemistry of curative and remedial substances.

Q.—What is **Inorganic Chemistry?**
A.—The chemistry of those substances yielded by the mineral kingdom. Or of those substances which do not contain Carbon in a combustible form.

Q.—What is **Organic Chemistry?**
A.—The chemistry of the Carbon compounds, particularly those containing Carbon in a combustible form.

Q.—What is **Analytical Chemistry?**
A.—The art of determining the chemical composition of substances.

Q.—What is **Qualitative Chemistry?**
A.—That branch of chemistry which determines the elemental constituents of substances.

Q.—What is **Quantitative Chemistry?**
A.—That branch of chemistry which determines the amounts of the elemental constituents of these substances.

Q.—Define **Assaying.**
A.—The determination of the amounts of valuable constituents of substances.

Q.—Define **Physics.**
A.—The science of the properties and forces of matter.

Q.—What is **Pharmaceutical Latin?**
A.—The Latin pertaining to the science and art of pharmacy.

Q.—What is **Pharmaceutical Arithmetic?**
A.—The arithmetic pertaining to the science and art of pharmacy.

Q.—What is **Pharmaceutical Jurisprudence?**
A.—The relation of pharmacy and law to each other.

Q.—Define **Mineralogy.**
A.—The science of minerals.

Q.—Define **Pharmacology.**
A.—The sum of all scientific knowledge concerning drugs and medicines; their nature, preparation, administration, effect, including pharmacognosy, pharmacy pharmaco-dynamics, and therapy-dynamics.

Q.—What is a **Pharmacopœia?**
A.—An authoritative book establishing standards for the identity, quality, purity, and strength, and giving directions for the preparation, valuation, preservation and compounding of drugs, chemicals and medicinal substances.

Q.—What is meant by the word "official?"
A.—Sanctioned or recognized by some governing body, when used in connection with the Pharmacopœia, or if used in con-

nection with some substance or preparation, recognized by the Pharmacopœia.

Q.—Why was a pharmacopœia found to be a necessity?
A.—Because preparations of a certain name were frequently made of different strength in different parts of the country according to different formulas, hence a national pharmacopœia was necessary for uniformity.

Q.—When was the first U. S. Pharmacopœia published?
A.—1820.

Q.—How often is the Pharmacopœia revised?
A.—Every ten years.

Q.—Why is this necessary?
A.—Because of the changes in the practice of medicine, some substances are used so infrequently as to make them unworthy of a place in the Pharmacopœia, new agents are found which must be given recognition and standardized.

Q.—When did the present Pharmacopœia become official?
A.—September 1, 1916.

Q.—How is the present official Pharmacopœia designated?
A.—U.S.P. IX, meaning the ninth decennial revision.

Q.—How many Pharmacopœias have we had?
A.—The present one is the tenth, hence the ninth revision.

Q.—Who has charge of the making of the Pharmacopœia?
A.—The Pharmacopœial Convention.

Q.—What is the composition of this body?
A.—Delegates from the Surgeon-General's office of the War Department, Bureau of Medicine and Surgery of the Navy Department, Bureau of Public Health of the Treasury Department, United States Department of Agriculture, American Medical Association, American Pharmaceutical Association, American Chemical Society, Association of Official Agricultural Chemists, Association of State and National Food and Dairy Departments, National Wholesale Druggists' Association, National Dental Association, State Medical and Pharmaceutical Societies, Schools of Medicine and Pharmacy.

Q.—Where does the Convention meet?
A.—In Washington D. C.

Q.—When does it meet?
A.—On the second Tuesday in May in each decennial year ending in zero.

Q.—What officers are elected for the convention?
A.—A president, five vice-presidents, a secretary, assistant secretary, and treasurer.

Q.—How is the business taken care of during the ten year interim between meetings?
A.—By a board of trustees, elected by the Convention.

Q.—How many Trustees are there?
A.—Seven, of whom five are elected as such, the other two, President of the Convention and Chairman of the Revision Committee being ex-officio members.

Q.—How many delegates were in the 1910 Convention?
A.—371.

Q.—How many organizations were represented?
A.—158.

Q.—How many states were represented?
A.—38.

Q.—Do all the delegates take part in the actual revision?
A.—No, the convention selects a Revision Committee of 50 members, the President of the Convention becomes an ex-officio member making a committee of 51.

Q.—What is a **Dispensatory?**
A.—An elaboration or commentary on the Pharmacopœia.

Q.—Are dispensatories official?
A.—No, they are issued by private individuals. They are not uniform but the information in them is reliable.

Q.—What dispensatories are used in the United States?
A.—The National Standard, United States, and American.

Q.—What two names does every pharmacopœial article have?
A.—The Latin title and the English title.

Q.—What other official name do some of them have?
A.—A synonym, as Laudanum in case of Tincture of Opium.

Q.—Why were so many synonyms introduced into U.S.P. IX?

A.—So that unscrupulous manufacturers might be successfully prosecuted for offering preparations below U.S.P. standards, under common names.

Q.—Give an example of the above nomenclature.

A.—Latin title, Magnesii Sulphas; English title, **Magnesium** Sulphate; Synonym, Epsom Salt.

Q.—What else is given to further identify the substance?

A.—Its chemical composition and molecular weight are included in the official definition or rubric.

Q.—What would be the chemical formula and molecular weight in case of Magnesium Sulphate?

A.—$MgSO_4 + 7\ H_2O = 246.50$.

Q.—What is meant by "**Purity Rubric**"?

A.—That clause under an article which states the percentage purity required in the particular article.

Q.—What other book is official?

A.—**The National Formulary.**

Q.—When did the National Formulary become official for the first time?

A.—July 1, 1906.

Q.—Who owns the National Formulary?

A.—The American Pharmaceutical Association.

Q.—How was it made official?

A.—Congress designated it as one of the legal standards for the execution of the Pure Food and Drugs Act.

Q.—When was the first edition of the National Formulary issued?

A.—In 1888.

Q.—What was the original purpose of the National Formulary?

A.—To give directions for the uniform making of pharmaceutical preparations which were in general use and which were not recognized by the U.S.P. Also as a repository for those formulas which were from time to time deleted from the U.S.P.

Q.—How many editions of the National Formulary have been published?
A.—Four.

Q.—Give the year of issue of each.
A.—1888, 1896, 1906, 1916.

Q.—How is the present official National Formulary designated?
A.—N.F. IV.

Q.—How often is the National Formulary revised?
A.—No definite period has been adopted but it has been the policy of the A. Ph. A. to revise it at the time the U.S.P. is revised.

Q.—How many members are there on the revision committee of the National Formulary?
A.—15.

Q.—How are the members of the committee selected?
A.—Elected by the Council of the A. Ph. A.

Q.—What is contained in Part I of N.F.?
A.—The preparations.

Q.—What is contained in Part II?
A.—Definitions and standards for the simple substances used in making the preparations which are not defined in the Pharmacopœia.

Q.—Define **Metrology.**
A.—It is the science of weights and measures.

Q.—What three dimensions of matter are determined by measure?
A.—Length, breadth, and thickness.

Q.—How is the measuring of any object carried out?
A.—The dimensions are compared with some standard.

Q.—What is the standard unit of the common linear measure?
A.—The yard.

Q.—Give the table of **linear measure.**

A.—12 inches	= 1 foot (ft.).
3 ft.	= 1 yard (yd.).
5½ yd.	= 1 rod (rd.).
40 rd.	= 1 furlong.
8 fur.	= 1 mile.

Q.—Give the table of "**square measure**".

A.—

144 sq. in.	=	1 square foot.
9 sq. ft.	=	1 square yard.
30¼ sq. yd.	=	1 square rod.
4 sq. rods	=	1 acre.
640 acres	=	1 square mile.
36 sq. mi.	=	1 township.

Q.—What is meant by cubic measure?

A.—The measure of three dimensions, length, breadth, and thickness. This also gives measurement of capacity.

Q.—Give the table of **cubic measure.**

A.—1728 cu. in. = 1 cu. ft.
27 cu. ft. = 1 cu. yd.

Q.—Into what classes is measure of volume, bulk or capacity divided?

A.—Into "liquid" and "dry".

Q.—By what other name is liquid measure called?

A.—**Wine measure.**

Q.—Give the table of liquid measure.

A.—

60 minims	=	1 fluidrachm.
8 fl. dr.	=	1 fluidounce.
16 fll. oz.	=	1 pint.
8 pints	=	1 gallon.

Q.—What is the unit of liquid measure?

A.—The gallon.

Q.—How many cubic inches in a gallon?

A.—231.

Q.—What is the symbol for gallon?

A.—C. or Cong.

Q.—What word do they stand for?

A.—Congius, the Latin word for gallon.

Q.—What is the symbol for pint?

A.—O. or Oct.

Q.—What word do they stand for?

A.—Octarius, having reference to ⅛, that is, one-eighth of a gallon.

Q.—Define **Weight.**

A.—It is the comparative attraction which the earth has for any body.

Q.—Name the systems of common weights used in the U. S.

A.—Avoirdupois, Troy, and Apothecaries'.

Q.—For what purpose is apothecaries' weight used?

A.—Only in compounding physicians' prescription.

Q.—For what purpose is troy weight used?

A.—For weighing precious metals.

Q.—For what purpose is avoirdupois weight used?

A.—For weighing all substances except precious metals and ingredients of prescriptions.

Q.—What system is used by wholesale houses selling drugs?

A.—Avoirdupois.

Q.—Does a ⅛ ounce bottle of morphine sulphate contain ⅛ of an avoirdupois or apothecaries' ounce?

A.—⅛ avoirdupois ounce.

Q.—Give the table of **Troy Weight.**

A.—24 grains	=	1 pennyweight (pwt.).
20 pwt.	=	1 ounce (oz.).
12 oz.	=	1 pound (lb.).

Q.—Give the table of **Avoirdupois Weight.**

A.—437.5	gr.	=	1 ounce.
16	oz.	=	1 pound.
100	lb.	=	1 Hundredweight (cwt.).
20	cwt.	=	1 ton.

Q.—Give the table of **Apothecaries' Weight.**

A.—20 gr.	=	1 scruple (℈).
3 scr.	=	1 drachm (ʒ).
8 dr.	=	1 ounce (℥).
12 oz.	=	1 pound.

Q.—How many grains in an Apoth. oz.?

A.—480.

Q.—How many grains in an Avoid. oz.?

A.—437.5.

Q.—How many grains does a fluidounce of water weigh?

A.—455 grains. (Exactly 454.6 gr.)

Q.—Why is the pound abbreviated "lb"?
A.—Comes from the Latin word "libra" meaning pound.

Q.—What is the weight of a pint of water in grains?
A.—7275. (Exactly 7273.1.)

Q.—What denomination of weight has the same value in all the systems?
A.—The grain.

Q.—What then is necessary in converting weights from one system to another?
A.—To first reduce the weight to grains.

Q.—How may the weight of one minim of water be found?
A.—By dividing the weight of 1 fluidounce of water by the number of minims in the ounce; $455 \div 480 = 0.947$.

Q.—What was the origin of the grain weight?
A.—It was created by an act of King Henry III of England in 1226 which decreed that "an English silver penny called the sterling, round and without clipping shall weigh 32 grains of wheat, well dried and gathered out of the center of the ear." In 1497 Henry VII changed the equivalent to 24 wheat grains.

Q.—What physical conditions influence weight and volume?
A.—Temperature and atmospheric pressure.

Q.—Is a drop and a minim the same measure?
A.—No, the minim is a constant and definite measure, the drop is seldom the same in two cases.

Q.—What governs the size of drops?
A.—Temperature, mobility of the liquid, thickness of the lip of the container, rapidity with which the liquid is dropped.

Q.—Give the table of **domestic or household measure.**
A.—

1 teaspoonful	= 1 drachm.
1 dessertspoonful	= 2 drachms.
1 tablespoonful	= 4 drachms.
1 wineglassful	= 2 fluidounces.
1 teacupful	= 4 fluidounces.
1 tumblerful	= 8 fluidounces.

METRIC SYSTEM

Q.—What other system of weights and measures is used?
A.—The metric system.

Q.—What is the meaning of the word "metric"?
A.—It is from a Greek word meaning "measure".

Q.—By what other names is the Metric system known?
A.—French, decimal, universal.

Q.—Why is it called the French system?
A.—Because it originated and was perfected in France.

Q.—What is the starting point of the Metric System?
A.—It is based on the Meter.

Q.—What is a **Meter?**
A.—It is a measure of length and is the standard unit of the Metric System for measure of length.

Q.—How is the Meter derived?
A.—It is 1/40,000,000 of the earth's circumference taken around the poles.

Q.—Why was this adopted?
A.—Because if for any reason the "standard meter" which is housed in Paris should be lost or destroyed, it will be an easy matter to make another, for scientists can easily compute the exaet meter again.

Q.—What are the divisions of the meter?
A.—Decimeter, centimeter, millimeter.

Q.—What fractions of the meter do these represent?
A.—1/10 (0.1), 1/100 (0.01), and 1/1000 (0.001.)

Q.—What is the standard unit of measure of volume in the metric system?
A.—**The Liter.**

Q.—How is it derived from the meter?
A.—It is the cube of the decimeter.

Q.—What name is applied to the 1/1000 part of the Liter?
A.—Mil meaning milliliter, formerly called cubic centimeter which was abbreviated C.c.

Q.—What is the standard unit of weight of the Metric System?
A.—**The Gramme.**

Q.—How is the Gramme derived?
A.—It is the weight of one mil of distilled water weighed in vacuum at its maximum density 4° C.

Q.—Is it absolutely correct to say that the 1/1000 part of the Liter weighs 1 gramme?

A.—Not according to the reports of the U. S. Bureau of Standards which report the weight of one liter as being 1000.027 Grammes. This means that one mil or one cubic centimeter weighs 1.000027 Gm. which difference is so slight as to be negligible.

Q.—Is the Gramme always spelled G-r-a-m-m-e?

A.—No, usually Gram.

Q.—State the connection between the three forms of measure of the Metric System.

A.—The unit of linear measure is the Meter, the unit of volume is the Liter which is the cube of the decimeter and the unit of weight is the Gramme which is the weight of a milliliter of water.

Q.—Name the divisions of the Liter and Gramme.

A.—They are exactly the same prefixes as are used with the meter, deciliter, centiliter, milliliter; decigram, centigram and milligram.

Q.—What are the multiples of these units?

A.—Deka = 10, Hecto = 100 and Kilo = 1000.

Q.—From what language are the divisions derived?

A.—Latin.

Q.—From what language are the multiple prefixes derived?

A.—Greek.

Q.—What word will aid in remembering the origin of these prefixes?

A.—"Gild," Greek increases, Latin decreases.

Q.—Are the units and multiples written with a capital or a small letter?

A.—With a capital.

Q.—How are the divisions written?

A.—With a small letter.

Q.—What are the abbreviations for the Meter and its divisions?

A.—M., dm., cm., mm.

Q.—What are the abbreviations for the multiples?

A.—Dm., Hm., Km.

Q.—Give the abbreviations for the unit, multiples, and divisions of the liter.

A.—L., Dl., Hl., Kl., dl., cl., ml. or mil.

Q.—Give the abbreviation for the unit, multiple, and divisions of the Gramme?

A.—Gm., Dg., Hg., Kg., dg., cg., mg.

Q.—Give the equivalents of the Metric units in the common or customary system.

A.—Meter = 39.37 inches.
Liter = 33.81 fl. oz.
Gram = 15.432 grains.

Q.—What is the equivalent of one grain in the metric system?

A.—0.065 (0.0648) Gm.

Q.—How is that found?

A.—If 1 Gm. equals 15.432 gr., then 1 gr. must be equal to $1 \div 15.432 = 0.0648$.

Q.—Read the following metric weights: (a) 0.1, (b) 0.02, (c) 0.003, (d) 0.0024, (e) 0.08765.

A.—(a) one decigram, (b) two centigrams, (c) three milligrams, (d) two and four-tenths milligrams, (e) eighty-seven and sixty-five hundredths milligrams.

Q.—What is the rule for converting Grams to grains?

A.—Since 1 Gm. = 15.432 gr., to convert Gm. to grains, multiply the number of Gm. by 15.432 and the result will be grains.

Q.—What is the rule for converting grains to metric weight?

A.—Since 1 gr. = 0.0648 Gm., to convert grains to metric weight, multiply grains by 0.0648 and the result will be metric equivalent.

Q.—What system of weights and measures is used in the Pharmacopœia and National Formulary?

A.—The Metric System.

Q.—What system is used in all scientific investigation?

A.—The Metric System.

Q.—Name two especially valuable advantages of the system.

A.—There is only one standard for each kind of measurement and the system is organized on the decimal plan which is the same as our monetary system.

SPECIFIC GRAVITY

Q.—Define **Specific Gravity.**

A.—It is the weight of a given volume of any substance as compared with the weight of the same volume of a substance which is used as a standard.

Q.—What is the substance which is used as the standard generally?

A.—Distilled Water.

Q.—What then is the Specific Gravity of Water?

A.—1.

Q.—Give the rule for finding the Specific Gravity of liquids.

A.—Divide the weight of a given volume of the liquid by the weight of exactly the same volume of water, the quotient is the specific gravity of the Liquid.

Q.—100 mils of Glycerin weighs 124.9 Gm., what is the Specific Gravity of the Glycerin?

A.—100 mils of water weighs 100 Gm., hence proceeding according to the rule, $124.9 \div 100 = 1.249$.

Q.—100 mils of a mixture of alcohol and water weighs 89 Gm., what is the Specific Gravity of the mixture?

A.—$89 \div 100 = 0.89$.

Q.—What is a **Pycnometer?**

A.—The technical name given to a bottle made for the purpose of taking specific gravities. A specific gravity bottle.

Q.—What physical conditions must be taken into account when Specific Gravities are being taken?

A.—Temperature and atmospheric pressure.

Q.—What is the **Law of Archimedes?**

A.—Substances immersed in a liquid are buoyed up with a force equal to the weight of the liquid displaced.

Q.—In what kind of substances is this law taken advantage of when taking specific gravities?

A.—In taking specific gravities of solids.

Q.—What is the rule for determining the specific gravity of solids heavier than water and insoluble in it?

A.—First weigh the substance in the air in the ordinary way, then weigh it suspended in water. Now subtract the weight in

water from the weight in air, which gives the loss of weight in water, then divide the weight in air by the loss of weight in water.

Q.—What does this loss of weight in water represent?

A.—The weight of the water having the same bulk or volume as the solid.

Q.—A piece of metal weighs 20 Gm.; when suspended in water and weighed, it weighs 18 Gm. What is the S. G.?

A.—$20 - 18 = 2$. $20 \div 2 = 10$.

Q.—How are specific gravities found when substances are soluble in water?

A.—By using some liquid in which the solid is not soluble, then proceeding in the same manner as with water; then multiply the quotient by the specific gravity of the liquid used.

Q.—Following the above, show how the S. G. of alum may be taken.

A.—Alum is soluble in water, hence alcohol is the liquid to use because alum will not dissolve in alcohol. A piece of alum is weighed in the air and found to weigh 4 Gm.; it is now suspended in alcohol and weighed and found to weigh 2 Gm., then $4 - 2 =$ 2 Gm. the loss of weight in alcohol. Now apply the rule, $4 \div 2 =$ 2 which is the specific gravity of alum compared with alcohol; now to get its comparison with water, multiply 2 by the S. G. of alcohol which is 0.82; then $2 \times 0.82 = 1.64$ the specific gravity of the alum.

Q.—How is the specific gravity of a powder found?

A.—By the use of a pycnometer of known capacity in which the powder of definite weight displaces water.

Q.—Give an example of the above using Calomel as the powder.

A.—Use a 25 mil pycnometer, weigh into it exactly 10 Gm. of calomel; now fill it with distilled water and weigh, the weight will be 33 Gm.; now subtract from this the weight of the calomel 10 and it leaves 23 Gm. of water; this shows that the 10 Gm. of calomel has displaced or occupies the same space as 2 Gm. of water. We see from this that equal volumes of water and calomel weigh respectively 2 Gm. and 10 Gm., then $10 \div 2 = 5$ the S. G. of the calomel.

Q.—How may the specific gravity of those substances lighter than water be determined?

A.—After weighing the light substance in air, a weight must be attached which will pull the light substance under water, then

the difference between the total weight of water displaced and that displaced by the attached heavy substance gives the weight of water displaced by the light body; then proceed in the usual way. Divide the weight of the light substance in air by the weight of the water displaced; the quotient will be the specific gravity of the light substance.

Q.—Give an example of the method for finding the S. G. of a piece of cork.

A.—A piece of cork weighs 1 Gm. As it will not force itself under water we attach a piece of metal to it which weighs 20 Gm. and which we found lost 2 Gm. when weighed in water. The cork and the metal are now both weighed under water and found to weigh 26 Gm., as we already know the metal weighs 20 Gm. and the cork 1 Gm. or 21 Gm. together, then $26 - 21 = 5$ the weight of water displaced by both; as the metal displaces 2 Gm., $5 - 2 = 3$ must be the weight of water displaced by the cork, then $1 \div 3 = 0.33$ the specific gravity of the cork.

Q.—What is a **Hydrometer?**

A.—An instrument for determining specific gravity of liquids by dropping it into the liquid.

Q.—Describe a hydrometer.

A.—It is a glass tube with two bulbs blown in it both below the center; the lower one is filled with mercury or shot to keep it upright; this also causes it to sink in the liquid and the specific gravity is shown by graduations which are etched on the upper part of the tube.

Q.—What is the best known hydrometer?

A.—The Baumé.

Q.—What is the relation between Baumé and specific gravity.

A.—Baumé is based on a salt solution while specific gravity is based on distilled water. For this reason arbitrary numbers are used in converting Baumé to specific gravity and vice versa.

Q.—How many Baumé hydrometers are there?

A.—Two. One for liquids heavier than water and one for those lighter than water.

Q.—What is the rule for converting Baumé to specific gravity in liquids heavier than water?

A.—Subtract the Baumé degree from 145, then divide 145 by this number.

Q.—Convert 25 Baumé heavy to specific gravity.

A.—145 - 25 = 120, 145 ÷ 120 = 1.208.

Q.—Give the rule for converting Baumé into specific gravity where liquids are **lighter** than water.

A.—Add the Baumé degrees to 130 and divide 140 by the number thus obtained.

Q.—Find the specific gravity which is 40° Baumé light.

A.—40 + 130 = 170, 140 ÷ 170 = 0.82 +.

Q.—Give the rule for converting Specific Gravity of liquids **heavier** than water into Baumé degrees.

A.—Divide 145 by the specific gravity, then subtract the quotient from 145; the answer is the Baumé degrees.

Q.—Give the Baumé degrees for Glycerin, S. G. 1.25.

A.—145 ÷ 1.25 = 116, then 145 - 116 = 29 Baumé degrees.

Q.—Give the rule for converting Specific Gravity of liquids **lighter** than water to Baumé.

A.—Divide 140 by the specific gravity and subtract 130 from the quotient, the remainder will be the Baumé.

Q.—What is the Baumé for alcohol S. G. 0.82?

A.—140 ÷ 0.82 = 170, then 170 - 130 = 40° Baumé light..

Q.—What kind of liquids is the Twaddell hydrometer for?

A.—For liquids heavier than water.

Q.—What is the relation of Twaddell degrees to Specific Gravity?

A.—Each degree is equal to 0.005 specific gravity + 1.

Q.—Find the specific gravity of Chloroform which is 95 Twaddell.

A.—95 × 0.005 = 0.475 + 1 = 1.475 S. G.

SPECIFIC VOLUME

Q.—What is **Specific Volume?**

A.—It is the relative volume of a certain weight of liquid as compared with the volume of the same weight of some standard, which standard is usually water, hence it is just the reverse of Specific Gravity.

Q.—What is the rule for finding Specific Volume?

A.—(a) Divide the volume of a certain weight of the substance

whose specific volume is sought by the volume of the same weight of water.

(b) or divide the weight of a given volume of water by the weight of the same volume of the liquid whose specific volume is sought.

(c) or divide 1 by the specific gravity of the substance.

Q.—Show by each of the three rules the specific volume of Glycerin.

A.—(a) 100 Gm. of Glycerin measures 80 mils; 100 Gm. of water measures 100 mils; then $80 \div 100 = 0.80$.

(b) 100 mils of Glycerin weighs 125 Gm., 100 mils of water weighs 100 Gm., therefore $100 \div 125 = 0.80$.

(c) the specific gravity of Glycerin is 1.25, therefore $1 \div 1.25 = 0.80$.

Q.—How else may Specific Volume be defined?

A.—It is the reciprocal of the Specific Gravity.

PERCENTAGE

Q.—What is the literal translation of "per cent"?

A.—It is a contraction of the term per centum, which is translated "by the hundred".

Q.—Tell just exactly what is meant by a 1% solution.

A.—It means that in every hundred parts of the solution there is one part of the active constituent.

Q.—Then what fractional part of anything is 1% of it?

A.—One one-hundredth, $\frac{1}{100}$ or 0.01.

Q.—Knowing the percentage strength of a solution and the quantity of it how is the amount of active ingredient determined?

A.—By multiplying the quantity of the solution by the percentage strength.

Q.—How many parts of salt will be required to make 100 parts of a 5% solution?

A.—$100 \times .05 = 5$.

Q.—How many terms are there in every percentage problem?

A.—Three.

Q.—Name them.

A.—Base, rate, and percentage.

Q.—How many of these must be given to solve a problem?
A.—Two.

Q.—Can any percentage problem be solved if two of the terms are given?
A.—Yes.

Q.—Are at least two terms always given?
A.—They may not both be given but the problem is so stated that both may be found.

Q.—Give the formulas for solving percentage problems.
A.—Base × rate = Percentage.
Percentage ÷ rate = Base.
Percentage ÷ base = Rate.

Q.—Is there some difference of opinion as to how percentage solutions in prescriptions are interpreted?
A.—Yes, some say they should all be filled by weight, others say it means a certain amount of solid in a definite measure of liquid.

Q.—What is the rational manner of interpretation?
A.—To put them up as the physician wants.

Q.—What is the academically correct method?
A.—To put them up by weight.

Q.—How does the physician usually intend them?
A.—A certain weight in a definite volume.

Q.—What name is given to such a solution?
A.—A weight/volume solution, generally designated w/v.

Q.—In the absence of further instruction how would you fill a prescription for 4 fl. oz. of 10% solution of potassium bromide?
A.—$455 \times 4 = 1820$. $1820 \times 0.10 = 182$ gr., hence dissolve 182 gr. potassium bromide in sufficient distilled water to make 4 fl. oz.

Q.—If 25 gr. of potassium bromide is dissolved in one fluidounce of water, what is the strength of the solution?
A.—1 fl. oz. equals 455 gr.; when we ask what is the percentage strength of the solution, we of course mean, how much salt is there in each 100 parts of the solution, hence $25 \div 455 = .0549 \times 100 = 5.49\%$.

Q.—How much 5% solution can be made from 25 Gm. of potassium iodide?
A.—$5\% = .05$, then $25 \div .05 = 500$ Gm.

Q.—What does the base in a percentage problem correspond to in pharmacy?
A.—The quantity of finished product.

Q.—What does the percentage correspond to?
A.—The active constituent.

Q.—What does the rate correspond to?
A.—Percentage strength.

HEAT

Q.—Define **Heat.**
A.—Heat is that form of molecular motion which increases temperature.

Q.—Name two other manifestations of molecular motion.
A.—Sound and light.

Q.—What effect does heat and cold have on the volume of matter?
A.—Increasing the heat causes matter to expand, increasing cold causes the volume of matter to contract.

Q.—Why does heat cause matter to expand?
A.—It increases molecular motion, causing the molecules to move farther away from each other, hence requiring more space.

Q.—In what three different states of aggregation may matter exist?
A.—Solid, liquid, and gaseous.

Q.—How may a body be changed from one state to another?
A.—By applying heat or taking away heat as the case may be.

Q.—In what three ways may heat be transferred?
A.—By radiation, conduction, and convection.

Q.—Give an example of the transference of heat by conduction.
A.—Place the end of an iron in a fire and allow it to remain for some time when an examination will show that the other end of the rod has become hot, due to the transference of heat by conduction.

Q.—Give an example of the transference of heat by radiation.
A.—The heating of the earth by the sun's rays.

Q.—What is meant by **Convection?**

A.—The transference of heat by currents. This form of conduction may be seen in heating in a fire-place. The stratum of air in direct contact with the fire is heated, expands, becomes lighter, rises, and is replaced by cold air, then the same rotation is set up again. Water in a container is heated in the same way.

Q.—What is **Sensible Heat?**

A.—That heat which is appreciable to the senses and can be measured.

Q.—What is **Latent Heat?**

A.—Hidden heat. Heat which can not be measured.

Q.—Give an example of latent heat.

A.—That heat which seemingly disappears when water is heated to boiling. Water can not be heated above 100° C. though the heat at the source may be 1000° C. This difference of 900° C. which seems to have been lost is absorbed by the water as latent heat; it may be spoken of as the latent heat of evaporation.

Q.—Does latent heat ever become sensible heat?

A.—Yes, as the heat in the steam just mentioned heats a room the heat becomes sensible, that is, the vapor is condensed to a liquid and the latent heat becomes sensible.

Q.—Name some good conductors of heat.

A.—Metals, gold, silver, and platinum in particular.

Q.—Name some poor conductors of heat.

A.—Wool, paper, straw, and wood.

Q.—What temperature is meant by the term "gentle heat"?

A.—From 30° to 40° C.

Q.—At what temperature are the solubilities of official substances taken?

A.—At 25° C.

Q.—What temperature has the Bureau of Standards adopted for refractive indices and some saccharimeters?

A.—20° C.

Q.—What is the temperature of cold water of the U. S. P.?

A.—15° to 25° C.

Q.—For "luke warm water"?

A.—35° to 40° C.

Q.—For "warm water"?
A.—60° to 70° C.

Q.—For "hot water"?
A.—From 85° to 95° C.

Q.—What instruments are used for measuring temperature?
A.—Thermometers and pyrometers.

Q.—Describe a **Thermometer.**
A.—A glass tube of uniform capillary bore ending in a bulb containing mercury or alcohol. The tube is graduated or is attached to a graduated scale.

Q.—Upon what physical principle is the use of the thermometer based?
A.—Upon regular and even expansion of the medium by the application of heat and contraction upon the application of cold.

Q.—Name the three thermometric scales in use.
A.—Fahrenheit, Celsius or centigrade, Reaumur.

Q.—What two standards must every thermometric scale have?
A.—High temperature standard and a low temperature standard.

Q.—What is the high temperature standard?
A.—The boiling point of water.

Q.—What is the low temperature standard?
A.—The melting point of ice or freezing point of water.

Q.—What is the boiling point of water on the Fahrenheit scale?
A.—212°.

Q.—What is the freezing point of water?
A.—32° above zero.

Q.—How was this particular point selected?
A.—Fahrenheit made a mixture of broken ice and ammonium chloride which he thought would produce the lowest possible cold and placed the thermometer in this. He marked the point to which the mercury fell zero. But this mixture would not produce a constant temperature hence the standard was changed to the freezing point of water which on that scale proved to be 32° above the zero point.

Q.—What is the boiling point of water on the Celsius or centigrade scale?

A.—100°.

Q.—What is the freezing point of water of the same scale?

A.—0.

Q.—What is the boiling point on the Reaumur scale?

A.—80.

Q.—What is the freezing point on this scale?

A.—0.

Q.—Why was 80 selected as the boiling point?

A.—In his experiments Reaumur used a mixture of water and alcohol in such proportions, that in raising it from the freezing point of water to the boiling point of water, 1000 volumes expanded to 1080 volumes.

Q.—Does it take any more heat to raise water from the freezing point to the boiling point on the Fahrenheit scale than on the Reaumur scale?

A.—No, the amount of heat is the same in all cases, if the altitude is the same.

Q.—What is the difference in degrees between the boiling point and the freezing point on the Fahrenheit scale?

A.—$212 - 32 = 180$, 180°.

Q.—What is the difference between the same points on the centigrade scale?

A.—100°.

Q.—What is the difference between the same two points on the Reaumur scale?

A.—80°.

Q.—Then if the amount of heat is the same, how can 180 be equal to 100 and to 80?

A.—It is simply a case of a difference in the size of the degrees.

Q.—If 180° F. equals 80° R., what does 1° F. equal in R.?

A.—$80 \div 180 = 0.4\ 4/9$, or $80/180 = 4/9$, or $180:80::1:4/9$.

Q.—If 180° F equals 100° C., what does one degree F equal in C.?

A.—$100 \div 180 = 0.5\ 5/9$, or $100/180 = 5/9$, or $180:100::1:5/9$.

Q.—Between what two points are all conversions made?

A.—Between the boiling point and freezing point of water.

Q.—What then is to be done when changing Fahrenheit degrees to the other scales?

A.—The first thing is to subtract 32 from the number of degrees, this makes the temperature read the same then as if read from the freezing point. Then multiply by 5/9 to convert to centigrade, or by 4/9 to convert to Reaumur.

Q.—What is done when converting the other scales to Fahrenheit?

A.—In case of centigrade multiply by 9/5 which gives the value at the point of freezing water; then 32 must be added to take the reading down to the zero point on the Fahrenheit scale.

Q.—How does this differ in converting Reaumur to F?

A.—Only that the R. degrees are multiplied by 4/9 instead of 5/9.

Q.—Give the formula for converting F. to C. degrees..

A.—F. degrees $- 32 \times 5/9 =$ C. degrees.

Q.—Apply this formula in the following example: convert 77° F to C.

A.—$77 - 32 = 45$ then $45 \times 5/9 = 25°$ C.

Q.—Give the formula for converting Fahrenheit to R.

A.—F. degrees $- 32 \times 4/9 =$ R. degrees.

Q.—Apply this formula in the following example: convert 77° F to R.

A.—$77 - 32 = 45$, then $45 \times 4/9 = 20°$ Reaumur.

Q.—Give the formula for converting C. to F. degrees.

A.—C. degrees $\times 9/5 + 32 =$ F. degrees.

Q.—Apply this formula in the following: convert 20 C. to F.

A.—$20 \times 9/5 = 36$, $36 + 32 = 68°$ Fahrenheit.

Q.—Give the formula for converting Reaumur to Fahrenheit.

A.—R. degrees $\times 9/4 + 32 =$ F. degrees.

Q.—Apply this formula to the following: convert 20 R. to F.

A.—$20 \times 9/4 = 45$, then $45 + 32 = 77°$ Fahrenheit.

Q.—Why is it necessary to subtract 32 when Fahrenheit temperature is converted to the other scales?

A.—Because the conversion is made upon "the freezing point of water" basis and as all Fahrenheit temperatures are read from

the zero point which is 32 degrees below the freezing point 32 must be subtracted to bring the number to this basis.

VAPORIZATION

Q.—Define **Vaporization.**

A.—The process of changing a solid or a liquid to a vapor, or gas.

Q.—Must heat always be applied to a liquid to cause it to vaporize?

A.—No.

Q.—What name is given to that form of vaporization without the application of heat?

A.—**Spontaneous Vaporization.**

Q.—May solids vaporize spontaneously?

A.—Yes.

Q.—Give an example of such vaporization.

A.—If iodine is stored in a clear glass container, one can see the violet vapors of the vaporized iodine in the upper part of the container. If camphor is stored in a shelf bottle, one can most always see a collection of particles of camphor on the back and upper part of the bottle. This is because the portion of the bottle next to the wall is cooler so the vapors arising from the camphor condense on this cooler portion.

Q.—Does vaporization of water go on even at quite low temperature?

A.—Yes.

Q.—Where may evidences of this be seen?

A.—Over any body of water when the temperature is near freezing.

Q.—Define **Evaporation.**

A.—The process of vaporizing a liquid for the purpose of reducing the bulk of the liquid or to obtain a solid residue.

Q.—What may be done to make evaporation proceed more rapidly?

A.—Use a broad dish so that more surface may be exposed to the heat and at the same time more surface exposed to the air; constantly stir the liquid which has the effect of renewing the

air just above the surface of the liquid which becomes charged with moisture from the evaporating liquid; reduce the pressure on the surface of the liquid.

Q.—Why are **Pharmaceutical Baths** used?

A.—To limit and evenly distribute heat.

Q.—Upon what physical principle are they constructed and used?

A.—Upon the principle that all matter gives out heat to surrounding matter.

Q.—Give an example of this principle.

A.—When water is heated it gives out its heat to anything in contact with it until both have the same temperature.

Q.—What substances are used for pharmaceutical baths?

A.—Water; saline solutions; steam; petrolatum or paraffin; sand.

Q.—What is the limit of heat when a **water-bath** is used?

A.—100° C.

Q.—Will water boil in an evaporating-dish on a water-bath?

A.—No, while the water may have a temperature of 100° it can not be transferred through the dish without some small loss.

Q.—How is a water-bath constructed?

A.—A metal container is used to hold the water, the top is usually made of concentric rings to fit any dish which one may have occasion to use.

Q.—If a bath limiting temperature to between 100° and 170° C., what bath is employed?

A.—A saline bath.

Q.—Just what is meant by a **Saline Bath?**

A.—A saturated solution of some salt in water.

Q.—How is a saline bath constructed?

A.—Just the same as the water-bath, except the saturated solution of salt takes the place of the water.

Q.—Will sawdust have any effect in raising the boiling point of water?

A.—No, mechanically suspended substances will not raise the boiling point of water.

Q.—What temperature may be had from a saturated solution of Sodium Chloride?

A.—108° C.

Q.—What salt is employed to obtain a temperature of 175° C.?

A.—A saturated solution of Calcium Chloride.

Q.—What bath is employed to obtain a temperature between 200° and 300° C.?

A.—Paraffin.

Q.—What heat is obtained from a **Sand Bath?**

A.—Practically the full heat of the burner; it serves to furnish a constant and regular heat which is not always obtainable from a naked flame.

Q.—What other agents are used to protect vessels from irregular heat?

A.—Wire gauze and asbestos plates.

BOILING

Q.—What is the difference between **Boiling** and evaporation?

A.—In evaporation, vapor forms only on the surface of the liquid, while in boiling, it forms throughout the liquid.

Q.—What is the technical term for boiling?

A.—**Ebullition.**

Q.—How is ebullition defined?

A.—The formation of vapor bubbles throughout a liquid.

Q.—With reference to atmospheric pressure, at what time does ebullition commence?

A.—When the tension of the vapor is sufficient to overcome the pressure of the atmosphere.

Q.—What is the boiling-point of water?

A.—100° C., 212° F., 80° R.

Q.—Is this the invariable temperature at which water will boil?

A.—This is the temperature at which it will aways boil at sea level.

Q.—Will it not boil at the same temperature on a mountain top?

A.—No.

Q.—In this case will the boiling-point be more or less than 100° C.?

A.—Less.

Q.—Why will it be less?

A.—Because the atmospheric pressure is less.

Q.—Is the boiling-point the same for all liquids?

A.—No.

Q.—What is the value of knowing the boiling-points of different liquids.

A.—It is one indication of identity and purity.

Q.—How may the boiling-point of a liquid be taken?

A.—Bring the liquid to boiling in a test-tube or flask and hold the thermometer in the vapor until the mercury becomes stationary, then read off.

Q.—What precaution must be taken if the vapors are inflammable?

A.—A distillation flask should be used and the vapors conducted into a condenser.

Q.—Name the sources of heat used in pharmaceutical operations.

A.—Combustion of coal-gas, alcohol or gasoline and electricity.

Q.—Why is boiling of such value in pharmacy?

A.—Because it acts as a preservative by destroying bacteria which would decompose preparations or otherwise render them unfit for use.

Q.—Give a particular instance where boiling is used in an official preparation in this way.

A.—In preparing Vinegar of Squill.

Q.—What is **Pasteurization?**

A.—Process of maintaining a substance at a temperature of from 60 to 65° C. for a time, for the purpose of destroying fermentive bacteria.

Q.—Why is this process opposed in its application to milk in some municipalities?

A.—It prevents the souring of milk to the extent that milk very near the point of putrefaction may be sold.

Q.—What is meant by **Sterilization?**

A.—The process of rendering anything free from pathogenic bacteria and spores.

Q.—What are spores?

A.—Undeveloped bacteria.

Q.—Is Sterilization accomplished in more than one way?

A.—Yes, in several ways.

Q.—Why is more than one method used?

A.—Because of the varying nature of different substances, some may be decomposed by methods which may be safely applied to others.

Q.—What is most common agent used in Sterilization?

A.—Heat.

Q.—Is heat used in more than one form?

A.—Yes,—the naked flame; dry heat in an oven; moist heat in the form of steam and boiling water.

Q.—What is perhaps the most common form of Sterilization?

A.—By heating in boiling water.

Q.—Will one application of boiling water render an object sterile?

A.—It might, but to be safe the object should be subjected to the heat of boiling water for a period of 30 minutes on three successive days.

Q.—Why is this desirable?

A.—Spores present may resist the killing effect of the boiling water at the first application but will be fully developed by the time of the last application and will then be killed.

Q.—How may prescription bottles be readily Sterilized?

A.—First well-washed, then stoppered with a pledget of cotton and placed in an oven. Raise the temperature to 180° C. and maintain it for 2 hours. Then place a cap of parchment paper over the cotton and fasten. When the bottle is to be used, remove the paper and subject the cotton and the lip of the bottle to the naked flame.

Q.—Is alcohol used for Sterilization?

A.—Yes, 70% alcohol is said to be an effective agent.

Q.—When preparations are decomposed by heat what is done to render them Sterile?

A.—They may be filtered through a germ-proof filter or if permissible, a small quantity of an antiseptic such as phenol may be added.

Q.—Does the U. S. P. or N. F. give directions for Sterilization?

A.—Yes, both books give fairly complete directions.

Q.—What is meant by the term **Tyndalization?**

A.—Repeated or interrupted sterilization.

DISTILLATION

Q.—Define **Distillation.**

A.—The process of vaporizing and subsequently condensing a liquid.

Q.—What is the apparatus called in which distillation is carried out?

A.—The retort and condenser.

Q.—Which part is the retort?

A.—That in which the liquid is placed to be vaporized.

Q.—Which part is the condenser?

A.—That in which the vapors are converted back to a liquid.

Q.—What is meant by a "tubulated" retort?

A.—One provided with an opening at the top of the bowl through which it may be filled or through which a thermometer may be introduced.

Q.—What conditions are necessary for converting the vapor to liquid?

A.—The vapor must come in contact with cold.

Q.—What is the process called when the vapor is cooled and converted into its original state?

A.—**Condensation.**

Q.—What is the object of Distillation?

A.—To separate one liquid from another or to separate liquids from solids held in solution. Purification.

Q.—What is the finished product of distillation called?

A.—The **Distillate.**

Q.—What is "**Fractional**" **Distillation?**
A.—The separation of two or more liquids having different boiling points, by the process of distillation.

Q.—In case the retort and condenser are combined in a single piece of apparatus, what is it called?
A.—A still.

Q.—What two classes of stills are there?
A.—Alembic, and retort and condenser.

Q.—What is the nature of an alembic still?
A.—The condenser is directly over the retort.

Q.—Name a still of the alembic type.
A.—The Phoenix.

Q.—Name a still of the retort and condenser type.
A.—The Remington.

Q.—Describe a **Leibig Condenser.**
A.—It is virtually a tube within a tube, the outer one acting as a jacket is kept filled with cool water which serves to condense the vapor as it passes through the inner tube.

Q.—Name a pharmacopœial substance which is prepared by distillation.
A.—Distilled water. Aqua hamamelidis.

Q.—Name a class of commercial products prepared by fractional distillation.
A.—The petroleum products: Gasoline, kerosene, petrolatum liquidum.

Q.—What is **Destructive Distillation?**
A.—The process of heating dry organic matter without access of air, until decomposition takes place and substances of simpler constitution are produced.

Q.—Name an official substance prepared by destructive distillation.
A.—Pix Liquida; Carbo Ligni.

SUBLIMATION

Q.—Define **Sublimation.**
A.—The process of vaporizing a volatile solid and then condensing the vapors to a solid again.

Q.—What is the object of Sublimation?
A.—Purification.

Q.—Which is the purified product that is sought—the condensed vapor or the residue in the retort?
A.—The condensed vapor.

Q.—Name an official substance prepared by sublimation.
A.—Iodine; Camphor; Mercuric chloride.

Q.—What name is given to condensed vapor?
A.—The **Sublimate.**

Q.—How does the process differ from Distillation?
A.—Only that the process is applied to Solids instead of Liquids.

Q.—Name two forms of Sublimates.
A.—Powdered and cake sublimate.

Q.—What causes these different forms?
A.—If the receiving vessel in the condenser is cold the sublimate will form in a very fine powder; if the receiving vessel is hot the sublimate will form in cakes.

Q.—What other name is sometimes applied to a powdered sublimate?
A.—Flowers, as Flowers of Sulphur.

FUSION

Q.—Define **Fusion.**
A.—Fusion is the process of changing a solid to a liquid without the aid of a solvent.

Q.—By what common name is Fusion known?
A.—Melting.

Q.—Do all substances melt at the same temperature?
A.—No.

Q.—Are all substances fusible?
A.—No.

Q.—What is the value of knowing the fusion-points of different substances?
A.—It is one means of arriving at the identity of the substance.

Q.—How is the fusion-point of a substance determined?

A.—A little of the substance is placed in a capillary glass tube and attached to a thermometer; both are then immersed in some liquid and heat applied until fusion takes place, when the temperature is read off.

Q.—Repeat the law concerning rise of temperature in melting substances.

A.—So long as any of the unmelted substance remains in the dish the temperature will not rise above the melting point of the substance, no matter what the temperature may be at the source of heat.

Q.—What liquids are used when melting points are being determined?

A.—Water, petrolatum, sulphuric acid, cottonseed oil.

Q.—Does either the U. S. P. or N. F. give methods for determining melting-points?

A.—Yes, U. S. P., page 596.

Q.—Can one be sure of the accuracy of the melting-point when only one reading is made?

A.—No, at least three should be taken, then the average of these taken if they are fairly uniform.

Q.—What effect does pressure have on melting-point?

A.—Practically none; this is entirely different from boiling-point determinations.

Q.—Define **Deliquescence.**

A.—The property which some substances have of spontaneously taking up moisture from the atmosphere and becoming liquid.

Q.—Name an official substance having this property.

A.—Potassium acetate; zinc chloride.

Q.—What is **Hygroscopicity?**

A.—The property which some substances have of absorbing moisture from the air and becoming soggy but not liquefying.

Q.—Name a class of substances which have this property.

A.—The solid extracts.

Q.—Define **Calcination.**

A.—The process of strongly heating inorganic substances for the purpose of driving off volatile matter.

Q.—What is the volatile matter which is usualy driven off?
A.—Water and carbon dioxide.

Q.—How is the process of Calcination used mostly as a pharmaceutical operation?
A.—In the making of oxides from carbonates. Lime which is calcium oxide is made from limestone, which is calcium carbonate, by strongly heating the carbonate, thus expelling carbon dioxide.

Q.—Name another official substance made by calcination.
A.—Magnesium oxide which is made by calcining the carbonate.

Q.—What other name is then applied to Magnesium Oxide?
A.—Calcined Magnesia.

Q.—In the process of calcination which portion is the desired portion, that driven off or that remaining in the crucible?
A.—That which remains in the retort.

Q.—How does Calcination differ from Sublimation?
A.—In sublimation it is the volatile portion of the substance which is sought, the residue being discarded, while in Calcination the volatile portion is rejected and the residue saved.

Q.—What is the name of the apparatus in which calcination is usually carried on?
A.—A crucible.

Q.—What material is used in making crucibles?
A.—Clay; graphite; porcelain; iron; nickel; platinum.

IGNITION

Q.—Define **Ignition.**
A.—It is the process of strongly heating a substance until a gas is given off in the form of a flame.

Q.—Is the process applied to organic or inorganic bodies?
A.—Inorganic.

DEFLAGRATION

Q.—Define **Deflagration.**
A.—Strongly heating a substance which gives off a gas with a crackling sound.

Q.—Name a substance which when heated will do this.

A.—Potassium nitrate when heated gives off oxygen with a crackling sound. Also potassium chlorate.

HEAT EFFECTS ON ORGANIC SUBSTANCES

Q.—Define **Desiccation.**

A.—The process of removing moisture from organic substances.

Q.—Define **Torrefaction.**

A.—The process of heating an organic substance for the purpose of modifying some objectionable principle without injuring the more valuable ones.

Q.—Define **Carbonization.**

A.—Strongly heating an organic substance without access of air for the purpose of reducing it to carbon or charcoal.

Q.—Define **Incineration.**

A.—Heating an organic substance strongly with free access of air for the purpose of reducing it to ash.

Q.—Name some official substances prepared by Desiccation.

A.—Thyroideum Siccum; Dried Thyroids.

Q.—Name a commercial article prepared by Torrefaction.

A.—Roasted coffee; Roasted peanuts.

Q.—Name an official substance prepared by Carbonization.

A.—Carbo ligni.

Q.—Point out an application of Incineration in pharmacy.

A.—In determining the percentage of ash in any of the official organic substances.

SOLUTION

Q.—Define **Solution.**

A.—The separation of the molecules of a substance and their diffusion through a liquid.

Q.—What specific name is applied to the liquid in which the substance is dissolved?

A.—The Solvent.

Q.—What specific name is applied to the substance to be dissolved?

A.—The Solute.

Q.—How many kinds of solution are there?
A.—Two.

Q.—Name them.
A.—Simple and chemical or complex.

Q.—Define **Simple Solution.**
A.—A solution in which the solute simply separates its molecules and diffuses through the solvent but which may be had back in its original form by evaporating the solvent.

Q.—Give an example of a simple solution.
A.—Dissolving common salt in water.

Q.—Define **Chemical or Complex Solution.**
A.—A solution in which the solute not only disappears in the solvent but also goes into chemical reaction with it forming a substance different from either of the original.

Q.—Give an example of chemical solution.
A.—The dissolving of Iodine in a solution of sodium hydroxide.

Q.—Tell why this is a chemical solution.
A.—A chemical reaction takes place forming Sodium Iodide, so upon evaporation Sodium Iodide will be obtained and **not** the original substances, Iodine and Sodium Hydroxide.

Q.—Is it necessary that the solute be of some particular nature or kind?
A.—No. A solid may be dissolved in water; a liquid may be dissolved in water; a gas may be dissolved in water.

Q.—When one liquid dissolves in another liquid is it usually spoken of as a solution?
A.—No, it may be called diffusion or more generally we say the liquids are miscible.

Q.—Give an example of this.
A.—Glycerin dissolves in water, but we usually say that glycerin and water are miscible.

Q.—When a gas dissolves in water is it usually spoken of as solution?
A.—No, it is usually called absorption.

Q.—Give an example of this.
A.—Hydrochloric acid gas will dissolve in water but is usually spoken of as being absorbed by water.

Q.—What is the particular thing necessary in solution?
A.—To break up cohesion in the solute.

Q.—Name three features which tend to favor solution.
A.—Heat; mechanical division; favorable position of the solute as regards the solvent.

Q.—What is meant here by "mechanical division"?
A.—Dividing the solute into small particles by grinding in a mill or triturating in a mortar.

Q.—How does this help solution?
A.—The substance being in finer particles presents a greater extent of surface to the action of the solvent.

Q.—Why does heat favor solution?
A.—Because it drives the molecules of the solute farther apart, thus breaking up cohesion.

Q.—What technical name is given to favorable position?
A.—Circulatory displacement.

Q.—Describe **Circulatory Displacement.**
A.—The substance to be dissolved is suspended in a bag of porous material or on a porous diaphragm just below the surface of the solvent. Now, as the solvent which is in contact with the solid becomes charged it sinks because of its greater specific gravity and fresh solvent takes its place. The constant falling and rising of the solvent, at all times establishes currents bringing that part of the solvent which has the greatest solvent power in contact with the solute.

Q.—How do the U. S. P. and N. F. usually state the solubility of a substance?
A.—By saying that 1 Gm. of the substance will dissolve in "so-many" mils of the solvent.

Q.—Name the more common solvents.
A.—Water, alcohol, glycerin, chloroform, ether, benzin, acetone, carbon disulphide, carbon tetrachloride, fixed and volatile oils.

Q.—When a solvent is spoken of but no particular one mentioned, which one is always understood?
A.—Water.

Q.—What is a **Saturated Solution?**

A.—A solution which contains all the solute which it can hold at normal temperature.

Q.—What is a **Supersaturated Solution?**

A.—One that has more of the solute than it can hold at normal temperature.

Q.—Can a saturated solution remain a saturated solution at more than one temperature?

A.—No, it is saturated at only one temperature.

Q.—How can a solution be supersaturated?

A.—Usually by heating the solvent and adding the solute.

Q.—What happens to a supersaturated solution when it cools to normal temperature?

A.—The excess of salt crystallizes out.

Q.—What objection has been raised to the use of supersaturated solutions?

A.—It is said that not only will the excess of salt crystallize out when cooled to normal temperature but that these crystals will act as a nucleus and induce more salt to crystallize out so that the resulting solution will not be saturated even at normal temperature.

Q.—What is the value of knowing the solubility of substances?

A.—It gives one an idea of the purity, identity, and strength of a substance in question.

Q.—At what temperature are the U. S. P. solubilities taken?

A.—At 25° C. or 77° F.

Q.—How is the **solubility of a substance determined?**

A.—First make a saturated solution of the substance at 25° C. then weigh off a definite weight of the solution. Now evaporate this weighed quantity to complete dryness and weigh the residue; now subtract the weight of the residue from the weight of the solution taken and this will show the weight of the water used to dissolve the residual salt and hence the number of mils required to dissolve 1 Gm. of the salt by dividing the weight of the water by the weight of the salt.

Q.—What effect does solution have on the temperature of the solvent or resulting solution?

A.—Usually simple solution lowers the temperature while chemical solution raises the temperature.

Q.—Is this invariably the case?

A.—No, it is said that dissolving potassium iodide in water very much lowers the temperature while dissolving sodium iodide in water raises the temperature.

Q.—Does dissolving a salt in a liquid increase the volume?

A.—Yes, some but never so much as the volume of the salt dissolved.

Q.—Does the same weight of different salts always cause the same increase in volume when dissolved?

A.—No, there is absolutely no relation between the volume increase caused by different salts.

OSMOSIS

Q.—Define **Osmosis.**

A.—It is the mingling or diffusion of liquids or gases through an organic membrane.

Q.—What is probably the best example of osmosis?

A.—The diffusion of plant juices through cell walls.

Q.—In what pharmaceutical process is osmosis used?

A.—Dialysis.

DIALYSIS

Q.—Define **Dialysis.**

A.—The separation of crystalloids from colloids by the process of osmosis.

Q.—Describe the process.

A.—The dialyser proper is a glass or gutta-percha vessel open at both ends. For use one of the open ends is covered with a piece of parchment which is securely fastened. Now the material to be dialyzed is placed on the parchment diaphragm and this is lowered into a larger vessel of water until the parchment is in direct contact with the water. In this position all substances which are crystallizable will find their way through the parchment into the water in the outer vessel, while the noncrystallizable ones will remain on the diaphragm.

Q.—What other name is given to the matter which passes through the membrane?

A.—The diffusate.

Q.—What other name is given to the matter which remains on the diaphragm?

A.—The dialysate.

CRYSTALLIZATION

Q.—Define **Crystallization.**

A.—The process whereby substances passing from a gaseous or liquid state to the solid state tend to arrange themselves into regular geometric forms.

Q.—What is the purpose of crystallization?

A.—Purification.

Q.—How does this purify them?

A.—Because of the fact that all substances which form into crystals reject all impurities when crystallizing.

Q.—What term is applied to those substances which do not crystallize?

A.—Amorphous, meaning literally, "without form."

Q.—What things determine the forms of crystals?

A.—Faces, edges, angles, and axes.

Q.—What is the face of a crystal?

A.—A plane surface bounding a part of a crystal.

Q.—What is the edge of a crystal?

A.—A line at which two adjoining faces meet.

Q.—What is an angle?

A.—The space enclosed by the intersection of two straight lines.

Q.—What is the axis of a crystal?

A.—An imaginary line drawn directly through a crystal from one point to a point opposite.

Q.—What is the plural of axis?

A.—Axes.

Q.—At what point in a crystal do the axes intersect?

A.—The center.

Q.—Name the more common shapes of crystals.

A.—Prismatic, laminar, tabular, acicular.

Q.—What is the meaning of "acicular"?

A.—Needle-shaped.

Q.—What is the meaning of "tabular"?
A.—Flat.

Q.—What is the meaning of "laminar"?
A.—Thin flat crystals or plates.

Q.—What is the meaning of "prismatic"?
A.—In the form of a prism.

Q.—What is the meaning of "dimorphous"?
A.—Means that a crystalline substance may naturally occur in two crystalline forms.

Q.—What is meant by "trimorphous"?
A.—That a substance may occur in three crystalline forms.

Q.—What is meant by "polymorphous"?
A.—That a substance may occur in many forms.

Q.—What is the meaning of "isomorphous"?
A.—The same form, that is two or more substances may crystallize in the same form.

Q.—Upon what does the "system of crystallization" depend?
A.—Upon the number of axes, their lengths, and the angles at which they intersect.

Q.—How many systems are there?
A.—Six.

Q.—Into how many groups are these divided?
A.—Two.

Q.—What feature divides them into the two groups?
A.—The angle formed at the intersection of three axes.

Q.—How are the groups named?
A.—Orthometric, when the three axes intersect at right angles, and clinometric if they intersect at oblique angles.

Q.—Name those systems belonging to the orthometric.
A.—Regular, or monometric; dimetric, or tetragonal; trimetric, or rhombic; hexagonal, or rhombohedric.

Q.—Name those of the clinometric system.
A.—Monoclinic, or oblique prismatic; triclinic, or doubly oblique prismatic.

Q.—What are the characteristics of the regular or monometric system?

A.—Crystals of this system have three axes of equal length and all intersect at right angles.

Q.—What are the characteristics of the tetragonal quadratic or dimetric?

A.—Crystals of this system have two axes of equal length and one of unequal length all intersecting at right angles.

Q.—What are the characteristics of the rhombic or trimetric?

A.—Crystals of this system have three axes all of different lengths but all intersecting at right angles.

Q.—What are the characteristics of the rhombohedric or hexagonal?

A.—Crystals in this system have four axes, three are of equal length in the same plane and cut a circle in six equal parts, making their angles 60°; these axes all intersect the fourth one which is of unequal length at right angles. The long axis is called the primary axis, the other three are known as secondary.

Q.—What are the characteristics of the monoclinic?

A.—Crystals in this system have three axes of unequal length, two of which form oblique angles and a third axis forms right angles with these.

Q.—What are the characteristics of the triclinic?

A.—Crystals in this system have three axes all of unequal length and all forming oblique angles with each other.

Q.—Name the methods used for producing crystals.

A.—Fusion; sublimation; cooling from a hot saturated solution; evaporation; precipitation; by addition of another liquid which has a strong affinity for the solvent; by introduction of a nucleus.

Q.—What is a "**Mother-liquor**"?

A.—The liquid remaining after crystals have formed.

Q.—What is a "**Pellicle**"?

A.—The crust or first formation of crystals on the surface of a liquid undergoing evaporation.

Q.—What is **Granulation?**

A.—A process of interrupted crystallization usually carried out by stirring as soon as crystallization begins.

Q.—What is **Fractional Crystallization?**

A.—The process of separating two salts which are held in the same solution, by the process of crystallization, the least soluble one being the first to crystallize out.

Q.—Name some features which cause the formation of large crystals.

A.—The solution must be allowed to cool slowly and the container must not be disturbed.

Q.—Do crystals form more readily on smooth or rough surface?

A.—On a rough surface as this seems to give a place for the first formation to attach and the crystals rather quickly grow.

Q.—What is "**Water of Crystallization**"?

A.—That water which a crystal naturally takes up when forming.

Q.—What is "**Water of Hydration**"?

A.—The same thing as water of crystallization.

Q.—What is "**Interstitial Water**"?

A.—Water which is held mechanically between parts of the crystal (in the interstices.)

Q.—By what other name is it sometimes called?

A.—Water of **Decrepitation.**

Q.—Why is it so-called?

A.—When the crystals are heated, this water is converted to steam and the pressure thus developed causes the crystal to burst into fragments with a cracking sound.

Q.—What is "**Water of Constitution**"?

A.—This is a term which is falling into disuse. Formerly it was urged that all the water of crystallization in a crystal need not be the same, that some was easily driven off by heating but that the balance was not driven off until quite high temperatures were reached, this which persisted was called water of constitution.

Q.—What is meant by **Efflorescence?**

A.—The property which some crystals have of naturally giving up their water of crystallization and falling in a powder.

Q.—Do they always become powdery?

A.—Not necessarily; some simply show a coating of white powder over the surface of the crystal.

Q.—What is meant by **Exsiccation?**

A.—Driving off the water of crystallization from salts by the application of heat.

Q.—Name some efflorescent salts.

A.—Borax, epsom salt; alum; sodium phosphate.

Q.—Name an official exsiccated salt?

A.—Exsiccated alum; exsiccated ferrous sulphate.

Q.—What is the strength of exsiccated or effloresced salts as compared with the crystals?

A.—The exsiccated or effloresced salts are must stronger.

Q.—Point out the difference between Efflorescence and Exsiccation?

A.—In efflorescence the salt loses its water of crystallization spontaneously, while in exsiccation the water of crystallization is driven off by the application of heat.

PRECIPITATION

Q.—Define **Precipitation.**

A.—The process of forming an insoluble substance by mixing solutions of two soluble substances.

Q.—What are the objects of precipitation?

A.—To obtain a substance in a finely divided condition and for purification.

Q.—What makes the difference between light and heavy precipitates?

A.—If the solutions used in the process are hot and rather concentrated they will produce a heavy precipitate; if they are cold and dilute the precipitate will be light.

Q.—Name an official substance made by precipitation.

A.—Magna Magnesia; Ferri Hydroxidi.

Q.—What is meant by "supernatant" liquid?

A.—The liquid which rests above a precipitate.

Q.—What adjectives are used to describe precipitates?

A.—Curdy, as silver chloride; granular, as magnesium phosphate, flocculent, as aluminum hydroxide; crystalline, as mercuric iodide.

Q.—What is meant by a "**Magma**"?

A.—A thick heavy precipitate which mechanically holds considerable quantities of water.

Q.—Name three official magmas.

A.—Magma Bismuthi; Magma Magnesia; Magma Ferri Hydroxidi.

FILTRATION

Q.—Define **Filtration.**

A.—The process of separating undissolved matter from a liquid by passing the liquid through a finely porous medium.

Q.—What is the name given to the liquid which has passed through the filter?

A.—**The Filtrate.**

Q.—Name some of the more common filtering media.

A.—Filter paper, purified cotton, sand, glass-wool.

Q.—When is glass-wool used as a filtering medium?

A.—When the liquid to be filtered is corrosive and likely to attack organic matter.

Q.—Name such a liquid.

A.—Sulphuric acid.

Q.—Name two kinds of folded filters.

A.—**Plain and Plaited.**

Q.—What other name is sometimes given to a plain filter?

A.—A chemical filter.

Q.—When is it especially useful?

A.—When a precipitate is to be separated from a liquid and then removed from the filter.

Q.—What disadvantage do they have?

A.—They filter very slowly.

Q.—How many plaits should a properly folded plaited filter have?

A.—32.

Q.—Name several points which favor rapid filtration.

A.—A properly folded filter; push the filter into the neck of the funnel; the filter should be first moistened and allowed to drain; the air must escape from the receiver; the funnel should

be kept filled as long as any unfiltered liquid remains; keep funnel well covered.

STRAINING, ETC.

Q.—Define straining.

A.—The process of separating undissolved matter from a liquid by passing the liquid through a coarsely porous medium.

Q.—What is the technical name for straining?

A.—Colation.

Q.—How does it differ from Filtration?

A.—The medium through which the liquid is passed is coarser; the undissolved matter less completely removed.

Q.—How is the process usually carried out?

A.—By hanging a cloth over a tenacle, then pouring the liquid on it. The cloth will hold back the solid matter.

Q.—What is a **Tenacle** or **Tenaculum?**

A.—An apparatus rectangular in form, made by placing four narrow, thin strips of wood in the form of a square, then fastening them at their intersections by means of a small nail; the nail is allowed to project through in each of the four points of intersection and on these the cloth is hung.

Q.—What is meant by **Decantation?**

A.—Pouring off. Usually applied to the removal of supernatant water from a precipitate.

Q.—What is meant by **Siphonization?**

A.—Removing a liquid by the use of a siphon.

Q.—What is a siphon?

A.—A tube bent at an acute angle, one leg usually being longer than the other.

Q.—How does it work?

A.—The air is completely exhausted from the siphon, either by suction or by completely filling the siphon with the liquid, then the shorter leg is placed in the liquid to be removed. The outer and longer leg containing a greater weight of liquid is emptied by gravity, which simulates the creation of a vacuum; then the liquid in the shorter leg flows over and this continues until the liquid in both containers has the same level or until the container is emptied.

Q.—What is meant by **Sedimentation?**

A.—Simply allowing a liquid which holds undissolved matter in suspension to stand until it collects, usually at the bottom of the container.

Q.—What is the difference between a Sediment and a Precipitate?

A.—A precipitate is formed by pouring together solutions of two soluble substances, while a sediment never has been in solution.

Q.—What is the common name for **Elutriation?**

A.—Water sifting.

Q.—What is the object of elutriation?

A.—To obtain a substance in a finely divided condition.

Q.—How is the process carried out?

A.—It is, of course, only possible to use water insoluble substances. A large vessel is filled with water and into this is thrown the ground solid; the coarse gritty particles at once sink, while the lighter and more bulky particles cling to the surface of the water. These are then separated by decantation and obtained by Sedimentation or by Evaporation.

Q.—Name an official article prepared by Elutriation.

A.—Prepared Chalk; Creta Preparata.

Q.—What is the process of forming it into cones called?

A.—**Trochization; Trochiscation.**

Q.—What is meant by the term **Lotion?**

A.—Washing, usually applied to the process of removing soluble by-products from a precipitate by pouring on some solvent liquid.

Q.—Define **Clarification.**

A.—The process of removing from a liquid a finely divided insoluble substance which interferes with its transparency.

Q.—Can this be performed by ordinary filtration?

A.—No.

Q.—Why can it not be so performed?

A.—Because the insoluble matter is so finely divided that it passes through the filter.

Q.—What two methods are used in clarification?
A.—Mechanical or physical and chemical.

Q.—What agents are used to effect clarification?
A.—Paper-pulp, talc, and kieselguhr.

Q.—How is the process carried out with one of these agents?
A.—The liquid to be clarified is well mixed with the agent selected, then poured on a filter. The agent spreads itself over the surface of the filter and arrests the finely divided insoluble matter and permits the liquid to pass through.

Q.—How does heat act as a clarifying agent?
A.—Yes.

Q.—How does heat act as a clarifying agent?
A.—It increases the fluidity of the liquid thus permitting insoluble substances to come to the surface where they may be removed by skimming or they may settle at the bottom. It may also have the effect of coagulating the finely divided insoluble particles and cause their more ready separation.

Q.—What other agents are used?
A.—Albumen and gelatin.

Q.—How is the albumen used?
A.—It is thoroughly well mixed with the liquid, then the mixture is heated. This coagulates the albumen which rises to the surface and carries up the insoluble particles with it. They may then be removed by skimming.

Q.—When may gelatin be used to advantage as a clarifying agent?
A.—When the turbidity is caused by tannin.

Q.—Is this form of clarification mechanical or chemical?
A.—Chemical, the gelatin forms an insoluble compound with the finely divided tannin and readily separates so it may be removed by filtration.

Q.—What other form of clarification is a chemical process?
A.—Fermentation. In this process the nature of the liquid changes from a saccharine watery liquid to an alcoholic liquid. In the process carbon dioxide forms and as the bubbles of it escape they may carry the insoluble matter to the top or the insoluble matter may settle.

Q.—What objection has been raised to the use of kieselguhr as a clarifying agent?

A.—It absorbs large quantities of the liquid and it will remove alkaloids from solutions.

Q.—Define **Decoloration.**

A.—The process of depriving liquids of their color.

Q.—Is it only liquids that may be deprived of their color?

A.—No, solids may be deprived of their color but they must of necessity be put into solution for the purpose.

Q.—As a pharmaceutical process, how is decoloration usually carried out?

A.—By passing the liquid through a column of animal charcoal.

Q.—Is it a physical or chemical process?

A.—Physical, and is due to the capillarity of the charcoal.

Q.—How should the charcoal be treated before using it for decolorizing?

A.—It should be heated to redness and allowed to cool.

Q.—Why should it be heated?

A.—By standing the capillaries will become clogged, heating will destroy this matter and free the capillaries.

Q.—What forms a valuable adjunct to charcoal in the process of decoloration?

A.—Clean white sand. If the column is made of alternate layers of charcoal and sand the process is facilitated.

Q.—Will wood charcoal answer in place of animal charcoal?

A.—No.

Q.—What precaution must be observed in decolorizing liquids?

A.—Liquids containing alkaloids, glucosides or neutral principles may lose them when passed through animal charcoal.

Q.—Define **Desiccation.**

A.—The process of driving out moisture from organic drugs.

Q.—Is the process applied to organic drugs only?

A.—Some authors and teachers make no further distinction between desiccation and exsiccation than to say that desiccation is driving off moisture at a low temperature and exsiccation is driv-

ing it off at high temperature. We prefer to look upon the process as applied only to organic substances.

Q.—Can this view be justified?

A.—Yes, there are no substances to which the term "desiccated" is applied but organic substances.

Q.—By what other names are desiccated substances called?

A.—Cured; dried.

Q.—What are the objects of desiccation?

A.—To reduce bulk, to promote preservation, and to facilitate comminution.

Q.—How does it aid preservation?

A.—The natural moisture in drugs would soon cause them to decay if stored in such condition.

Q.—How does desiccation facilitate comminution?

A.—It would be impossible to reduce a drug containing its natural moisture to a fine powder but when it is deprived of the moisture it may be readily reduced.

Q.—What care must be observed when artificial heat is used in desiccation?

A.—To see that the temperature is never so great as to volatilize or destroy any principle in the drug.

Q.—Name an official article prepared by desiccation.

A.—Serum Antidiphthericum Siccum; Thyroideum Siccum.

Q.—Name a commercial article prepared by desiccation.

A.—Desiccated coconut; desiccated apples.

Q.—Define **Garbling.**

A.—Examining organic drugs for the detection and removal of adulterations and spoiled portions.

Q.—Define **Comminution.**

A.—The process of reducing drugs to a finer state of division.

Q.—What is the object of Comminution?

A.—To obtain a greater extent of surface.

Q.—What processes are included in Comminution?

A.—Slicing; cutting; grating; bruising; grinding; triturating; levigating; pulverizing.

Q.—Define **Contusion.**

A.—The process of bruising usually applied to green or fresh drugs by pounding them in a mortar with a pestle.

Q.—Define **Trituration.**

A.—The process of rubbing a substance in a mortar for a long time for the purpose of reducing it to a fine powder.

Q.—What materials are used in making mortars?

A.—Wedgewood; porcelain; glass; iron; brass; agate; wood; stone; ivory.

Q.—What is wedgewood?

A.—A kind of prepared pottery so made as to resist the corrosive action of chemicals.

Q.—What objection has been raised to wedgewood?

A.—It is somewhat absorptive.

Q.—What chemical substance is directed to be triturated in a glass mortar?

A.—Iodine.

Q.—Define **Levigation.**

A.—The process of rubbing a substance in a liquid in which it is insoluble for the purpose of reducing it to a very fine state of division.

Q.—Name an official preparation in which this process is used.

A.—Unguentum Hydrargyri Oxidi Flavi.

Q.—Define **Sifting.**

A.—The process of separating finer particles from coarser particles by passing through an apparatus called a sieve.

Q.—How is the number of a sieve designated?

A.—By the number of meshes to the linear inch in the fabric of the sieve. That is, a No. 80 sieve has 80 meshes to the linear inch.

Q.—What finenesses of powder are described in the Pharmacopœia?

A.—Numbers 100; 80 very fine; 60 fine; 50 moderately fine; 40 moderately coarse; 30; 20 coarse; 12 very coarse; 6.

Q.—How is the fineness further defined?

A.—By giving the maximum diameter of the particles.

Q.—Give these diameters.

A.—

Number	Diameter		Number	Diameter	
100	= 0.14	millimeter	30	= 0.54	millimeter
80	= 0.17	"	20	= 0.85	"
60	= 0.23	"	12	= 1.47	"
50	= 0.28	"	6	= 3.00	"
40	= 0.38	"			

Q.—What is meant by an "impalpable" powder?

A.—A powder of such fineness that the separate particle can not be distinguished by touch.

Q.—Define **Extraction.**

A.—The process of separating the active principles of an organic drug from its inert principles by the use of a suitable solvent.

Q.—In processes of extraction, what name is applied to the solvent?

A.—The **menstruum**; Plural, menstrua.

Q.—What solvents are used in extraction?

A.—Water, alcohol, glycerin, aromatic spirit of ammonia, ether, and to these are added acids, alkalies and chloroform.

Q.—What is meant by the term "**exhausted**"?

A.—When a drug has been completely deprived of its active constituents, it is said to be exhausted.

Q.—What term is used to designate the exhausted drug which remains after extraction?

A.—The **marc.**

Q.—Name the processes used in extraction.

A.—Maceration, digestion, percolation, filtration, expression, infusion and decoction.

Q.—Define **Maceration.**

A.—A process of extraction in which the drug in the proper fineness is mixed with the menstruum and allowed to stand for a time in a well-closed container.

Q.—Define **Digestion.**

A.—It is the process of maceration in conjunction with gentle heat.

Q.—Define **Expression.**

A.—The process of forcibly separating liquids from solids usually by means of a straining cloth or a tincture press.

Q.—Define **Infusion.**

A.—A process of extraction in which boiling water is poured upon the coarsely comminuted drug and allowed to stand for 30 minutes, then strained and expressed.

Q.—Define **Decoction.**

A.—A process of extraction in which the coarsely comminuted drug is mixed with cold water, then heated to boiling and boiled for 15 minutes, after which it is cooled to room temperature, strained and expressed.

Q.—What kind of vessels should be used for infusion and decoction?

A.—Nonmetallic and closely covered.

Q.—Why should nonmetallic vessels be used?

A.—Because nearly all organic drugs contain tannin and tannin would be liable to react with metal and discolor if not ruin the preparation.

Q.—Why should the container be well-closed?

A.—To prevent the escape of volatile principles.

Q.—What class of drugs is best adapted to extraction by infusion?

A.—Those easily extracted and having fairly volatile principles, as flowers and leaves.

Q.—What class of drugs is best adapted to extraction by decoction?

A.—Harder parts as barks and roots, stems.

Q.—What is **Lixiviation?**

A.—A crude process of extraction in which the substance to be extracted is thrown into a wooden hopper, then water poured on which forces its way down through the substance dissolving out the soluble matter.

Q.—What use was made of this process in the early days in this country?

A.—Wood ashes were placed in the hopper and extracted with water to dissolve out potassium carbonate which in turn was used as an alkali in making soap.

PERCOLATION

Q.—Define **Percolation.**

A.—A process of extraction in which a powder or mixture of powders contained in an apparatus called a percolator is subjected to the solvent action of successive portions of a menstruum in such manner that the liquid as it traverses the powder in its descent to the receiver shall be charged with the soluble portions of it and pass from the percolator free from insoluble matter.

Q.—By what other name is percolation sometimes called?

A.—Displacement.

Q.—Why is it so called?

A.—Because the solvent after becoming charged with the soluble part of the drug is displaced by fresh portions of the solvent liquid.

Q.—What name is given to the liquid which comes from the percolator?

A.—The percolate.

Q.—Why is a drug powdered when it is to be extracted?

A.—Because in the powdered form it presents a greater extent of surface to the action of the solvent.

Q.—What is the general rule for determining the degree of fineness necessary in extraction?

A.—The stronger in alcohol the menstruum the finer the powder must be; the more aqueous the menstruum the coarser the drug may be.

Q.—Having the drug, menstruum, and percolator, tell how the process is actually carried out.

A.—The drug is first moistened with the menstruum and allowed to stand for six hours. It is then packed in the percolator and covered with a piece of filter paper which is weighted down. Menstruum is now poured on until the column of powder is saturated and there is a stratum above. As soon as the percolate begins to drop the lower orifice is closed, the top is covered and it is allowed to macerate for from 12 to 48 hours as may be required. Then percolation is allowed to proceed slowly, adding menstruum as required until the drug is exhausted.

Q.—Why is the drug first moistened and allowed to stand before packing in the percolator?

A.—To give the drug an opportunity to absorb moisture and

swell as much as it will. If this were not done it would swell when the menstruum was poured on in the percolator, and swell so much as to prevent the flow of the menstruum through the drug.

Q.—Why is it allowed to macerate for a time before percolating?

A.—This gives an opportunity for the menstruum to exert its solvent action on the soluble constituents of the drug so they may be more readily dissolved when percolation begins.

Q.—What points must be observed in selecting a menstruum for extracting a drug?

A.—It must be a good solvent for the soluble and active constituents of the drug and be able to hold them permanently in solution after extraction.

Q.—What can you say about packing the drug tightly?

A.—The more alcoholic the menstruum the tighter the drug should be packed.

Q.—Why is glycerin so frequently included in a menstruum?

A.—It is a good solvent for astringent principles and has the property of holding in solution most any thing that water and alcohol will dissolve.

Q.—Why should the column of powder always be kept covered with menstruum as long as there is any to be used?

A.—When the column of powder is exposed to air, the air at once enters the powder, then when more liquid is poured on the air must escape and goes the way of least resistance and this is towards the surface. The air forcing its way out disarranges the well packed powder so exhaustion will then hardly be possible.

Q.—How rapidly should the percolate flow?

A.—From 8 to 10 drops per minute for fluidextracts and not more than 20 drops per minute for tinctures.

Q.—Why is there so much difference in the rate of flow between fluidextracts and tinctures?

A.—The fluidextracts are much stronger and more concentrated and a smaller volume of menstruum is permitted for the extraction, so it proceeds more slowly so that each drop may be completely charged with soluble matter.

Q.—How may the rapidity of the flow be regulated?

A.—In arranging the percolator there is a piece of rubber tubing fixed at the bottom of the percolator and this may be raised and lowered and held in place by a rubber band around the percolator and tube. Or a clamp may be placed on the tube and the flow regulated by opening and closing this. Or in place of a rubber tube a screw fixture similar to those in toilet water bottles may be inserted in the cork in the lower end of the percolator and the rate of flow be regulated with this.

Q.—How may one tell when a drug is exhausted?

A.—To determine this intelligently the operator must have a knowledge of the active constituents. If they are alkaloidal a few drops of percolate are collected to which may be added an alkaloid precipitant solution, then if any alkaloid still remains in the drug a white precipitate or cloud will show; if the constituent is resinous a few drops of the percolate may be dropped into a little water,—resins being insoluble in water will show a precipitate if any remains in the drug.

Q.—Is the presence or absence of color in the percolate a good way to determine the exhaustion of a drug?

A.—No, for the quantity of coloring matter may have no relation whatever to the active constituents.

Q.—Is the taste of the percolate to be relied upon as an indication of exhaustion?

A.—Not entirely, but it is perhaps a better criterion than color. If the percolate has no taste other than that of the menstruum, it is quite likely that the drug is exhausted.

Q.—What materials are used in making percolators?

A.—Glass, earthenware, and metal.

Q.—When are metallic percolators used?

A.—When very large quantities of drug are to be extracted, as in pharmaceutical manufacturing concerns.

Q.—Does the pharmacist ever have occasion to use a metallic percolator?

A.—Yes, some drugs must be extracted with boiling water and this would break a glass percolator.

Q.—What different forms of percolators are there?

A.—Conical and cylindrical.

Q.—What features are essential for ideal percolation?

A.—(1) Correct apparatus.

(2) Proper fineness and uniformity of powdered drug.

(3) Correct menstruum.

(4) Careful regulation of the flow of percolate.

Q.—What part of the process of percolation requires the greatest skill?

A.—Probably packing the drug in the percolator.

Q.—What may be taken as an indication of correct packing?

A.—The evenness with which the menstruum runs down through the powdered drug.

Q.—What may be taken as an indication of poor packing?

A.—When the menstruum runs through one part of the column of powder more rapidly than another.

Q.—How will this affect the percolation?

A.—The drug will be very imperfectly exhausted.

Q.—What is meant by fractional percolation?

A.—Instead of percolating all the drug in one percolator at one time, the drug is divided into three portions and each portion extracted separately.

Q.—Where is this form of percolation used?

A.—In making some fluidextracts.

Q.—Why is it used?

A.—In order to exhaust the drug volume for weight without subjecting any portion to the action of heat.

Q.—Is fractional percolation an official method of extraction?

A.—Yes, required in making some of the fluidextracts of both the U. S. P. and N. F.

Q.—Describe the method.

A.—For example, start with 1000 Gm. of powdered drug which is to be made into fluidextract. The drug is first divided into three portions,—500, 300 and 200 Gm. The 500 Gm. portion is first extracted, it is moistened and packed in the usual manner. Menstruum is now poured on and the first 200 mils of percolate is collected and set aside as reserve. More menstruum is poured on and 5 portions of 300 mils each of weak percolate are collected, numbering each lot No. 1 to No. 5. Now the 300 Gm. portion is

taken and moistened in the usual manner, except that weak percolate No. 1 from the first extraction is used, following this with No. 2, then with the balance in regular rotation. From this lot of drug 300 mils of percolate are collected and set aside, then 4 lots of weak percolate of 200 mils each are collected and numbered. Then the last portion of drug (200 Gm.) is moistened with the first portion of the weak percolate from the second lot of drug, packed in the usual manner, and the balance of the weak percolate from the second lot of drug used to obtain 500 mils of percolate. The three reserve portions are now combined, 200, 300 and 500 making 1000 mils of fluidextract which have been obtained from 1000 Gm. of the drug.

AQUÆ—WATERS

Q.—Define **Aquæ.**

A.—Solutions of volatile substances in water.

Q.—Into how many classes may the Waters be divided?

A.—Three: Natural; Aromatic; Chemical.

Q.—Name the methods used in preparing the Waters.

A.—Simple solution; solution by intervention: distillation; chemical reaction and absorption: sterilization.

Q.—By which method are those made which are solutions of the volatile oils?

A.—Solution by intervention.

Q.—What substance is used for intervention?

A.—Purified talcum.

Q.—Why is this preferred?

A.—It is insoluble and serves to divide the oil into smaller particles, thus offering greater extent of surface to the solvent action of the water.

Q.—What other substances are permitted?

A.—Purified Siliceous Earth and Paper Pulp.

Q.—What other methods are permitted for preparing the waters from the volatile oils?

A.—Dissolving the oil in hot water, allowing to cool and then filtering. And by mixing the oil with water and then distilling. Or the drug may be mixed with water and distilled.

Q.—Has magnesium carbonate ever been used instead of purified talcum?

A.—Yes.

Q.—What is the objection to its use?

A.—The carbonate or the hydroxide which it contains is sufficiently soluble to form compounds with the acids which some of the oils contain. Also there may be sufficient magnesium in the water to react with chemicals with which it may be prescribed.

Q.—Has Precipitated Calcium Phosphate ever been used?

A.—Yes.

Q.—What is the objection to it?

A.—It is somewhat soluble, particularly in the presence of acid liquids. It is said also to form with water a pabulum for microscopic growths.

Q.—How many U. S. P. Waters are official?

A.—18.

Q.—How many in the N. F.?

A.—One.

Q.—Name those of the U. S. P. made by simple solution.

A.—Aqua Amygdalæ Amaræ; Chloroformi; Aurantii Florum; Creosoti; Rosæ.

Q.—What is the strength of **Bitter Almond Water?**

A.—0.1%.

Q.—Why is talcum not used in making this water from a volatile oil?

A.—Because the oil of bitter almond will readily dissolve to that extent.

Q.—Is this a saturated solution?

A.—No.

Q.—Are most of the Waters saturated solutions?

A.—Yes.

Q.—Why then is this not saturated?

A.—Because the active constituent is hydrocyanic acid and to make a saturated solution of the oil would introduce entirely too much of this potent agent.

Q.—What is the dose?

A.—4 mils.

Q.—How is **Orange Flower Water** prepared?

A.—By mixing equal volumes of Stronger Orange Flower Water and Distilled Water.

Q.—What does the U. S. P. direct about dispensing this water?

A.—That it should be freshly made at the time of dispensing.

Q.—What is the strength of **Chloroform Water?**

A.—0.5%.

Q.—Does the U. S. P. describe it as being of this strength?

A.—No, but it is saturated and chloroform is said to be soluble in 1:200.

Q.—How does the U. S. P. direct that this be prepared?

A.—A convenient quantity of water is used and an excess of chloroform is added, then the whole thoroughly shaken.

Q.—How can an excess of chloroform be present and not be dispensed when Chloroform Water is used?

A.—The chloroform has a Sp. Gr. of 1.476 so any that is not in solution will collect in a globule at the bottom of the container.

Q.—What kind of a bottle must be used to store it in?

A.—An amber-colored glass bottle.

Q.—Why must it be amber-colored?

A.—To protect the chloroform from the action of the light.

Q.—What effect does light have on it?

A.—Decomposes it into Hydrochloric Acid, Chlorine and Phosgen.

Q.—Is this water to be filtered?

A.—No.

Q.—What care is to be observed in dispensing this water?

A.—Pour off the required volume, then fill with recently boiled and cooled distilled water and shake thoroughly, being sure that there is an excess of chloroform.

Q.—Where should the water be stored?

A.—In a cool dark place.

Q.—What is the strength of **Aqua Creosoti?**

A.—1%.

Q.—What is the source of Creosote?

A.—Obtained by the fractional distillation of Beechwood Tar.

Q.—What does the U. S. P. direct about dispensing this water?
A.—It is not to be used unless it has been recently prepared.

Q.—Why is this necessary?
A.—Upon standing a short time the creosote decomposes and a tarry layer settles out.

Q.—Is this water to be filtered?
A.—Yes.

Q.—What is the dose?
A.—10 mils.

Q.—How is **Aqua Rosæ** prepared?
A.—By mixing equal volumes of Aqua Rosæ Fortior and Distilled Water at the time of using?

Q.—Name the waters made by intervention from volatile oils.
A.—Aqua Anisi; Foeniculi; Menthæ Viridis; Cinnamomi; Menthæ Piperitæ.

Q.—What other water is made by intervention?
A.—**Aqua Camphoræ.**

Q.—Describe the method for preparing Camphor Water.
A.—The camphor is powdered by triturating it with a little alcohol; it is then thoroughly triturated with purified talcum; then the water is added under constant trituration and finally the mixture is filtered, the filtrate being returned until it runs through bright and clear.

Q.—Why should alcohol evaporate before the water is added and filtered?
A.—Alcohol is a good solvent for camphor and might carry an excess through the filter into the water.

Q.—Name the waters made by distillation.
A.—Aqua Aurantii Florum Fortior; Destillata Sterilisata; Destillata; Hamamelidis; Rosæ Fortior.

Q.—What is the source of **Aqua Aurantii Florum Fortior?**
A.—It is obtained as a by-product in the distillation of oil of orange flowers.

Q.—How must it be kept?
A.—In containers stoppered with purified cotton, in a cool, dark place.

Q.—Why is it kept in this manner?
A.—If tightly stoppered it is likely to develop a musty odor and mucoid growth.

Q.—Which of the other waters is prepared and stored in exactly the same manner?
A.—Aqua Rosæ Fortior.

Q.—How is **Aqua Destillata** prepared?
A.—A convenient quantity of water is put into a still with a glass or block-tin condenser. The first 10% of distillate to come over is rejected; the next 75% is collected and kept as "distilled water;" the last 15% is allowed to remain in the still.

Q.—Why is glass or block-tin used as a condenser tube?
A.—Because neither is attacked by water as is lead.

Q.—Why is the first 10% of distillate rejected?
A.—Because it will contain all of the gases which were in the water.

Q.—What gases might one expect to find in the water?
A.—Carbon dioxide, ammonia, and products of organic decomposition.

Q.—Why is the last 15% allowed to remain in the still?
A.—It contains the nonvolatile impurities of the water and further heat might decompose some remaining organic matter which might be carried over.

Q.—How should it be stored?
A.—In glass-stoppered bottles which have been rinsed with hot distilled water just before being filled.

Q.—How does the U. S. P. define Aqua Destillata?
A.—Water purified by distillation.

Q.—What tests are given for Distilled Water?
A.—Tests to show the absence of sulphate, chloride, calcium, metals, ammonia, carbon dioxide, organic or other oxidizable substances.

Q.—Is it imperative that Distilled Water and nothing else be used in prescriptions calling for Distilled Water?
A.—Absolutely imperative.

Q.—Why is it so necessary?

A.—Because the ordinary water is likely to contain sufficient chloride, sulphate or other chemical in solution to decompose delicate chemicals which may be ordered on prescription.

Q.—Will the condensed steam from engine exhausts and ordinary steam-boilers answer for Distilled Water?

A.—No, for it is always contaminated with either oil or iron.

Q.—How is **Aqua Destillata Sterilisata** prepared?

A.—The necessary quantity of freshly distilled water is placed in a sterile hard glass flask and stoppered with a pledget of sterile, purified cotton, then boiled for 30 minutes. It is allowed to cool without removing the cotton, then a piece of paper is tied tightly over the cotton and mouth of the flask to protect it from dust.

Q.—How soon after preparation must it be used?

A.—Within 48 hours.

Q.—Why does the U. S. P. direct the use of Distilled Water **freshly boiled?**

A.—Because Distilled Water upon standing will absorb more or less carbon dioxide from the air and this may react with some of the ingredients of the mixture to form insoluble products.

Q.—What are the synonyms for **Aqua Hamamelidis?**

A.—Witch Hazel Water; Distilled Extract of Witch Hazel.

Q.—Give the official definition.

A.—A saturated aqueous liquid obtained by distilling with steam or water the bark, smaller stems or the entire shrub of Hamamelis Virginiana collected in the autumn, and adding 150 mils of alcohol to each 850 mils of distillate. Preserve in tightly-closed containers in a cool place.

Q.—How is the Hamamelis treated before distillation?

A.—100 parts are macerated with 200 parts of water.

Q.—Why is the alcohol added?

A.—To prevent fermentation of the aqueous solution of organic matter.

Q.—Under what circumstances might the Water have an acetous odor?

A.—If the alcohol had undergone oxidation and been converted to acetic acid.

Q.—What dangerous adulterant is sometimes found in it?
A.—Wood alcohol.

Q.—What derivative of Wood Alcohol is sometimes found in it?
A.—Formaldehyde.

Q.—Is this Water ever given internally?
A.—Probably not, as the U. S. P. gives no dose.

Q.—What are its therapeutical properties?
A.—Said to be slightly astringent.

Q.—Name the chemical waters.
A.—Aqua Ammoniæ; Aqua Ammoniæ Fortior.

Q.—What is the source of Ammonia?
A.—A by-product in the manufacture of illuminating gas.

Q.—What is the strength of **Ammonia Water?**
A.—10% by weight of ammonia.

Q.—What is Ammonia?
A.—It is a gas having the chemical formula NH_3.

Q.—How should Ammonia Water be stored?
A.—In glass-stoppered, hard glass bottles free from lead.

Q.—How does it react toward litmus?
A.—Alkaline; turns litmus blue.

Q.—What happens when Hydrochloric Acid is brought close to Ammonia Water?
A.—Dense white fumes of Ammonium Chloride are formed.

Q.—Does it lose its Ammonia readily?
A.—Yes, quite so, for which reason it should be frequently tested.

Q.—What is the dose?
A.—1 mil.

Q.—What is it therapeutically?
A.—Antacid and stimulant.

Q.—What is the strength of **Aqua Ammoniæ Fortior?**
A.—28% of Ammonia gas.

Q.—What are the shining particles sometimes seen in containers of Ammonia Water?
A.—Silica, which may be filtered out.

Q.—What care should be observed in handling the Stronger Ammonia Water?
A.—To keep from inhaling the fumes as they are very powerful.

Q.—Is it ever given internally?
A.—No, and should never be tasted unless highly diluted.

Q.—Name the N. F. Water.
A.—**Aqua Phenolata.**

Q.—What is its strength?
A.—2.2% liquefied Phenol.

Q.—What is it therapeutically?
A.—Antiseptic.

LIQUORES—SOLUTIONS

Q.—Define **Liquores.**
A.—Solutions of nonvolatile substances in water.

Q.—What is the English name for liquor?
A.—Solution.

Q.—Are there any exceptions to the definition given for liquores?
A.—Yes, several.

Q.—Name them.
A.—(1) Liquor Iodi Comp., the iodine is volatile.
(2) Liq. Formaldehyde, formaldehyde is a gas, hence volatile.
(3) Liq. Ammonii Acetatis, easily expelled by heat.
(4) Liq. Antisepticus, contains 25% of alcohol.

Q.—What methods are used in the preparation of the Liquores?
A.—Simple solution and Chemical Reaction and solution; and one by Extraction.

Q.—Name the U. S. P. Liquores made by Simple Solution.
A.—Liquor Acidi Arsenosi; Potassii Hydroxidi; Arseni et Hydrargyri Iodidi; Sodii Arsenatis; Cresolis Compositus; Sodii Chloridi Physiologicus; Iodi Compositus; Sodii Glycerophosphatis; Sodii Hydroxidi.

Q.—Name those made by Chemical Reaction.
A.—Liquor Ammonii Acetatis; Calcis; Ferri Chloridi; Ferri et Ammonii Acetatis; Ferri Subsulphatis; Ferri Tersulphatis; Formaldehydi; Hydrogenii Dioxidi; Magnesii Citratis; Plumbi Sub-

acetatis; Plumbi Subacetatis Dilutus; Potassii Arsenitis; Potassii Citratis; Sodæ Chlorinatæ; Zinci Chloridi.

Q.—Name the Liquor made by Extraction.
A.—Liquor Hypophysis.

Q.—How is Liq. Acidi Arsenosi prepared?
A.—By dissolving 1 Gm. Arsenic Trioxide in water with the aid of 5 Gm. Hydrochloric Acid Dilute.

Q.—Why is this called **Solution of Arsenous Acid** and not Solution of Arsenic Trioxide?
A.—Because when Arsenic Trioxide is dissolved in water it forms the true Arsenous Acid.

Q.—Does the Hydrochloric Acid react chemically with the Arsenic Trioxide?
A.—No, it simply aids solution.

Q.—What are the synonyms for the Solution?
A.—Hydrochloric Acid Solution of Arsenic; Solution of Arsenic Chloride.

Q.—What is it therapeutically?
A.—Alterative.

Q.—What is the dose?
A.—0.2 mil.

Q.—Is the preparation assayed?
A.—Yes, it should contain 1% As_2O_3.

Q.—What is the synonym for **Liquor Arseni et Hydrargyri Iodidi?**
A.—Donovan's Solution.

Q.—What is there in it?
A.—1% each of arsenous iodide and mercuric iodide.

Q.—Is Mercuric Iodide soluble in water?
A.—No.

Q.—How is it then that it is in solution in this preparation?
A.—The Arsenous Iodide is soluble and the Mercuric Iodide dissolves in this solution.

Q.—What is the color of the Solution?
A.—It should not be darker than a pale yellow.

Q.—What does a darker color indicate?
A.—A decomposition of the solids with the liberation of iodine.

Q.—What is the dose?
A.—0.1 mil.

Q.—What is the strength of **Liquor Cresolis Compositus**?
A.—50% of Cresol.

Q.—What else is there in the preparation?
A.—Potassium Hydroxide and Linseed Oil; Alcohol.

Q.—What is the purpose of the Potassium Hydroxide and Linseed Oil?
A.—Reaction between these forms a soft soap in which the Cresol dissolves.

Q.—Why is it not dissolved directly in the water?
A.—It is only slightly soluble in water, 1 to 60.

Q.—What use is made of the solution?
A.—Used as an antiseptic.

Q.—What "trade" preparation is like it?
A.—Lysol.

Q.—If this mixes cloudy with water, what is the cause?
A.—It will generally be found that the Linseed Oil has not been completely saponified.

Q.—Can a slight turbidity be avoided in mixing it with water?
A.—Hardly, for the Cresol is so slightly soluble in water. It dissolves in the strong soap solution but when a large quantity of water is used the Cresol will separate slightly and show turbidity.

Q.—Why is alcohol used in the preparation?
A.—This is to promote the reaction between the Linseed Oil and the Potassium Hydroxide.

Q.—What is the common name for **Liq. Iodi Compositus**?
A.—Lugol's Solution.

Q.—What is there in it?
A.—Iodine 5% and Potassium Iodide 10%.

Q.—Why is Potassium Iodide used?
A.—The Iodine is not soluble in water, hence a solution of Potassium Iodide is made in which the Iodine will dissolve.

Q.—How should it be kept?
A.—In glass-stoppered bottles, protected from the light.

Q.—How should this solution react with Starch T. S.?
A.—A drop of the solution added to 1 mil of Starch T. S. in 10 mils of water should give a deep blue color.

Q.—What is the dose?
A.—0.2 mil.

Q.—Might it be considered poisonous?
A.—Yes.

Q.—What is the antidote?
A.—Copious draughts of starch water, then an emetic.

Q.—What is it therapeutically?
A.—Externally, counterirritant, parasiticide; internally, alterative.

Q.—What is the synonym for **Liquor Potassii Hydroxidi?**
A.—Liquor Potassæ. Solution of Potassa.

Q.—What is its strength?
A.—Not less than 4.5% of Potassium Hydroxide.

Q.—How much KOH does the U. S. P. direct to be used to make 1000 Gm. of this solution?
A.—60 Gm.

Q.—Why does this not make a 6% solution?
A.—Because the U. S. P. only requires 85% purity in the Potassium Hydroxide.

Q.—How must this solution be stored?
A.—In hard glass bottles, with rubber stoppers. If glass stoppers are used they must be coated with petrolatum.

Q.—Why must the stoppers be so treated?
A.—The solution acts dissolvingly on the glass forming a solution of potassium silicate, the water then evaporates leaving the stoppers cemented in the bottles.

Q.—Why must this solution be well-stoppered?
A.—It will absorb carbon dioxide from the air and form potassium carbonate.

Q.—What is it therapeutically?
A.—Antacid.

Q.—What is the dose?
A.—1 mil.

Q.—Is it poisonous in large quantities?
A.—Yes.

Q.—What is the antidote?
A.—Vinegar, or lemon juice.

Q.—What is **Liquor Sodii Arsenatis** made from?
A.—1% of dried sodium arsenate.

Q.—How must the sodium arsenate be first treated?
A.—Dried to a constant weight at 150° C.

Q.—What is the chemical formula for this salt?
A.—Na_2HAsO_4.

Q.—What will be the chemical name for it?
A.—Secondary sodium arsenate. Di-sodium-mono-hydrogen arsenate.

Q.—What is **Liquor Sodii Arsenatis, Pearson?**
A.—This is a solution of dried sodium arsenate, official in the National Formulary, but is only one-tenth the strength of the U. S. P. solution.

Q.—What is the dose of Liq. Sodii Arsenatis?
A.—0.2 mil.

Q.—What is it therapeutically?
A.—Alterative.

Q.—Was **Liquor Sodii Chloridi Physiologicus** official in any previous pharmacopœia?
A.—No, it became official in the IX revision for the first time.

Q.—What is the strength?
A.—0.85%.

Q.—Why is this strength selected?
A.—Because it is thought to make a solution having the same osmotic pressure as the blood.

Q.—How is the solution made?
A.—By dissolving the required weight of pure sodium chloride in freshly distilled water, then filtering. Next sterilize the solution at a temperature of 115° to 120° C. for 15 minutes or by boiling for one hour. It must be preserved in a sterile condition and not used after 48 hours.

Q.—What use is made of this solution?

A.—It may be injected directly into the circulation to sustain patients who have suffered the loss of considerable quantities of blood. It may also serve as a vehicle for salts or preparations which are to be injected subcutaneously or directly into the circulation.

Q.—Had **Liquor Sodii Glycerophosphatis** been official before the appearance of U. S. P. IX?

A.—No.

Q.—What is its strength?

A.—50%.

Q.—What is it therapeutically?

A.—Nervine, alterative.

Q.—What is the dose?

A.—0.35 mil.

Q.—What are the synonyms for **Liquor Sodii Hydroxidi?**

A.—Liquor Sodae. Solution of Soda.

Q.—What is its strength?

A.—Not less than 4.5%.

Q.—How much Sodium Hydroxide is used to make 1000 Gm. of the solution?

A.—56 Gm.

Q.—Why must so much be used?

A.—Because the U. S. P. requires only 90% purity for the Sodium Hydroxide.

Q.—How must the Solution be kept?

A.—In hard glass bottles with rubber stoppers or glass stoppers coated with petrolatum.

Q.—Give the official definition for **Liq. Ammonii Acetatis.**

A.—An aqueous solution containing not less than 7% of Ammonium Acetate, with small quantities of acetic and carbonic acids.

Q.—What is the synonym?

A.—Spirit of Mindererus.

Q.—What is it made from?

A.—5% ammonium carbonate and 100% dilute acetic acid.

Q.—What kind of Ammonium Carbonate is directed?
A.—Hard translucent pieces.

Q.—Why must it be this kind?
A.—Because the pieces which are covered with powder contain too much bicarbonate.

Q.—May this Liquor be kept in stock?
A.—No, the U. S. P. directs that it not be dispensed unless freshly made.

Q.—Why is this?
A.—The carbon dioxide which it contains makes it more palatable, and upon keeping the carbon dioxide is lost.

Q.—What is it therapeutically?
A.—Diuretic and diaphoretic.

Q.—What is the dose?
A.—15 mils.

Q.—Into what U. S. P. preparation does it enter?
A.—Liq. Ferri et Ammonii Acetatis. Basham's Mixture.

Q.—What is the synonym for **Liquor Calcis**?
A.—Lime water.

Q.—What is its active constituent?
A.—Calcium Hydroxide.

Q.—What is its strength?
A.—0.14% of Calcium Hydroxide.

Q.—What is it made from?
A.—Lime (calcium oxide) and water.

Q.—What is done with the first portion of water added to the lime?
A.—After standing in contact with the lime for a half-hour it is rejected.

Q.—Why is it rejected?
A.—Because it is charged with soluble impurities which it has dissolved from the lime.

Q.—What are these impurities?
A.—Chlorides of calcium and magnesium and salts of the alkali metals.

Q.—Why is the magma of calcium hydroxide washed with water?

A.—To insure the removal of all soluble impurities particularly chlorides.

Q.—What test is applied to insure the complete removal of chlorides?

A.—To some of the washings, a drop of silver nitrate T. S. is added, and no more than a faint cloudiness should appear, indicating absence of more than a trace of chloride.

Q.—How does Liq. Calcis react with litmus?

A.—Alkaline; turns litmus blue.

Q.—What is the reason for the scum or pellicle often seen on the surface of lime water?

A.—Carbon dioxide is absorbed from the air, thus forming calcium carbonate which is insoluble.

Q.—Why does lime water become turbid when heated?

A.—Calcium hydroxide is less soluble in hot water than in cold, hence the calcium hydroxide is precipitated. It however goes into solution again when the liquid cools.

Q.—Why must the water used in slaking the lime be added gradually and not all at one time?

A.—The chemical reaction set up between the lime and water produces heat which tends to break down the pieces of lime.

Q.—Would not the same result be had if all the water was added at one time?

A.—No, the larger quantity of water would tend to cool the heat of reaction.

Q.—What is lime water therapeutically?

A.—Antacid and mild astringent.

Q.—What is the dose?

A.—15 mils.

Q.—Why is it so frequently given with milk to infants and invalids?

A.—It prevents the formation of large and bulky curds during the digestion of the milk, hence milk so treated is more easily digested.

Q.—What is the synonym for **Liquor Ferri Chloridi?**

A.—Solution of Iron Perchloride.

Q.—What is used in making the solution?
A.—Fine iron wire, hydrochloric acid, nitric acid, and water.

Q.—When the reaction between the iron and the hydrochloric acid is complete, what has been formed?
A.—A solution of ferrous chloride.

Q.—Why is the mixture of iron, acid and water heated on the water bath?
A.—To promote the reaction between the iron and acid.

Q.—What is the cause of the effervescence seen during the heating?
A.—It is the escaping Hydrogen given off by the reaction.

Q.—What is the color of the filtered solution of ferrous chloride?
A.—Green.

Q.—Why is nitric acid used?
A.—For the purpose of oxidizing the solution of ferrous iron to ferric.

Q.—What is the valence of ferrous iron?
A.—Two.

Q.—What is the valence of ferric iron?
A.—Three.

Q.—Why is hydrochloric acid added to the filtrate just before pouring into the nitric acid?
A.—This is decomposed to furnish Chlorine for the additional valence given to the iron in the process of oxidation.

Q.—How may one tell when the oxidation is complete?
A.—When no more brown fumes are given off and the solution has assumed a clear reddish-brown color.

Q.—If the solution is black what does it indicate?
A.—That the solution is not completely oxidized.

Q.—What must be done then?
A.—Add more nitric acid drop by drop until no more brown fumes arise and the solution becomes clear and reddish-brown.

Q.—Why is hydrochloric acid added at the finish of the preparation?
A.—To insure acidity, so there will be no formation of oxychloride.

Q.—If on standing such oxychloride does form what is the remedy?

A.—Heat the mixture and add a few drops of hydrochloric acid to dissolve the precipitate.

Q.—What is the strength of the preparation?

A.—It must contain sufficient ferric chloride to correspond to not less than 10% nor more than 11% of metallic iron.

Q.—How is the solution to be stored?

A.—In glass-stoppered bottles protected from the light.

Q.—Why must it be protected from the light?

A.—Because light is a reducing agent, hence would tend to reduce the solution to ferrous iron.

Q.—How is the excess of nitric acid removed from the solution?

A.—By heating it.

Q.—What test is used to show absence of nitric acid?

A.—A clear crystal of ferrous sulphate is added to a mixture of the ferric chloride solution and sulphuric acid, when no brown color should show around the crystal of ferrous sulphate, indicating absence of nitric acid.

Q.—Explain the chemistry of this test.

A.—Nitric acid is an oxidizing agent; ferrous sulphate is in the ferrous state but may be oxidized to ferric. If therefore nitric acid is present it will oxidize the ferrous sulphate to ferric sulphate and the color will change from green to brown.

Q.—What is the specific gravity of the solution?

A.—1.29 to 1.32.

Q.—What use is made of the solution?

A.—Principally as an ingredient of other preparations, particularly tincture of ferric chloride.

Q.—What is the common name for **Liq. Ferri et Ammonii Acetatis?**

A.—Basham's Mixture.

Q.—What is it made from?

A.—50% solution of ammonium acetate, 6% dilute acetic acid, 4% tinct. ferric chloride, 12% each glycerin and aromatic elixir, then water to 100%.

Q.—What does the U. S. P. direct about dispensing this preparation?

A.—It is not to be dispensed unless recently prepared.

Q.—What color is the preparation?

A.—A rich blood-red color.

Q.—What gives it this color?

A.—The ferric acetate.

Q.—How should the solution act toward litmus?

A.—Should be acid; turns litmus red.

Q.—Why does a precipitate form in it?

A.—The solution of ammonium acetate is alkaline instead of being acid in reaction.

Q.—What is the precipitate that forms?

A.—Probably basic ferric acetate.

Q.—When such precipitate occurs, can the preparation be remedied?

A.—The precipitate may be dissolved by the addition of more acid but this does not make it fit for use. It should be rejected and a new lot made.

Q.—What is it therapeutically?

A.—Diuretic and diaphoretic, hematinic.

Q.—What is the dose?

A.—15 mils.

Q.—What is the synonym for Liq. Ferri Subsulphatis?

A.—Monsel's Solution.

Q.—What is it made from?

A.—Ferrous sulphate 67.5%, sulphuric acid 6.5%, nitric acid, and water.

Q.—What is the nitric acid for?

A.—To oxidize the ferrous sulphate solution to ferric sulphate.

Q.—Why is iron wire not used, as in the case of Liq. Ferri Chloridi?

A.—Because ferrous sulphate is a common article of commerce, so it is not necessary to make it at the time of making the solution.

Q.—Why is sulphuric acid added?

A.—To furnish sulphate radicle for the added valence of the iron.

Q.—Why must the ferrous sulphate be added in divided portions to the acids?

A.—Decomposition of the nitric acid forms a gas which would "bump" and throw some of the liquid from the container, if it were all added at one time.

Q.—What must be done if the solution is black?

A.—Add more nitric acid drop by drop as long as brown fumes are given off.

Q.—How is the solution freed from excess of nitric acid?

A.—By further heating and stirring.

Q.—How must the solution be stored?

A.—In well stoppered containers, in a warm place and protected from the light.

Q.—If a semisolid white mass forms, what must be done?

A.—Heat it gently.

Q.—Why must all ferric solutions be protected from the light?

A.—Light is a reducing agent and tends to reduce ferric compounds to ferrous.

Q.—What especial use is made of Monsel's Solution?

A.—It is used as a local application to stop bleeding.

Q.—What is the strength of the solution?

A.—It must contain basic ferric sulphate corresponding to not less than 13% nor more than 14% of iron.

Q.—What is the dose?

A.—0.2 mil.

Q.—What is the strength of **Liq. Ferri Tersulphatis?**

A.—It must contain normal ferric sulphate corresponding to not less than 9.5% nor more than 10.5% iron.

Q.—What is it made from?

A.—Ferrous sulphate 50%, sulphuric acid 9.6%, nitric acid, and water.

Q.—Just what is the difference between this and the subsulphate solution?

A.—In this solution more sulphuric acid and less ferrous sulphate is used. This means of course that the preparation is weaker in iron.

Q.—What is the strength of **Liquor Formaldehydi?**

A.—37% of formaldehyde.

Q.—What is generally found associated with the formaldehyde?

A.—Methyl alcohol.

Q.—Why is this present?

A.—To prevent the uniting of the molecules of formaldehyde to form paraldehyde, a solid substance.

Q.—What is it used for?

A.—As a disinfectant and antiseptic; germicide.

Q.—What care should one take if considerable quantities of the solution are to be used?

A.—The nostrils and lips should be covered with petrolatum as it is very irritant.

Q.—What is the antidote for poisoning by this solution?

A.—Give ammonia water well diluted. This forms the well-known compound hexamethyleneamine.

Q.—What is the synonym for **Liquor Hydrogenii Dioxidi?**

A.—Solution of Hydrogen Peroxide; Peroxide.

Q.—What gives the value to this Solution?

A.—The oxygen which is readily released from combination.

Q.—How does the U. S. P. define its strength?

A.—The solution must contain not less than 3% by weight of H_2O_2.

Q.—What is this equivalent to in Oxygen?

A.—Each volume of the solution gives up 10 volumes of oxygen.

Q.—How must it be preserved?

A.—In a cool place protected from the light.

Q.—Why must it be so stored?

A.—Because both light and heat tend to make it lose oxygen.

Q.—If there is some considerable pressure on the cork when it is removed, what does it indicate?

A.—That some of the oxygen has been released and that the preparation is probably not up to standard.

Q.—Is the solution decomposed by oxidizing or reducing agents?

A.—By both.

Q.—How may the loss of oxygen be retarded?

A.—By coating the cork stopper with paraffin or by stoppering the bottle with purified cotton.

Q.—Is the solution acid, neutral, or alkaline?

A.—Slightly acid.

Q.—Is this necessary?

A.—Yes, otherwise the solution is rather quickly decomposed.

Q.—How is the solution generally made?

A.—By decomposing hydrated barium dioxide with phosphoric acid.

Q.—Could it be made from any other peroxide?

A.—Yes, it might be, but barium is selected because the barium may then be removed from the resulting solution completely upon the addition of sulphuric acid.

Q.—Is any preservative used?

A.—A very small amount of acetanilid has been used to retard decomposition.

Q.—Is this effective?

A.—Yes, it does retard decomposition but after standing for some time the solution is found to be quite acid from acetic acid which no doubt comes from the acetanilid.

Q.—What is the solution used for?

A.—As an antiseptic and bleaching agent.

Q.—What is it assayed with to determine its strength?

A.—Decinormal volumetric solution of Potassium Permanganate.

Q.—What is there in **Liq. Magnesii Citratis?**

A.—Magnesium carbonate 15 Gm., citric acid 33 Gm., syrup 60 mils, oil of lemon, potassium bicarbonate, and water.

Q.—How much solution is made from the above?

A.—350 mils.

Q.—Why is heat used in making the solution?

A.—The solution may be made more quickly and the solution is in a measure sterile when finished.

Q.—What is formed when the magnesium carbonate and citric acid are mixed with water?

A.—Magnesium citrate is formed and carbon dioxide is given off.

Q.—Is the magnesium citrate formed, the normal salt?

A.—No, it is an acid salt.

Q.—Why is this desirable?

A.—Because the acid salt is the more soluble.

Q.—What is the Potassium Bicarbonate for?

A.—This is decomposed by the excess of citric acid present and furnishes carbon dioxide which charges the solution, making it more palatable.

Q.—What care should be taken in storing this solution to prevent the loss of carbon dioxide?

A.—The bottles should be placed on side or up side down so as to keep the stopper soaked and tight.

Q.—Why should the bottle be rinsed with boiling water just before filling?

A.—To sterilize the bottle, this prevents the growth of microorganisms.

Q.—What impurities or adulterations does the U. S. P. give tests for?

A.—Tartaric acid, sulphate and calcium.

Q.—What is the solution therapeutically?

A.—Laxative and cathartic.

Q.—What is the dose?

A.—The contents of one bottle.

Q.—How is the solution assayed?

A.—The magnesium citrate is converted to pyrophosphate and the equivalent of MgO calculated.

Q.—What must the assay show?

A.—That each 100 mils of the solution contains the equivalent of 1.5 Gm. MgO.

Q.—What is the synonym for **Liquor Plumbi Subacetatis?**
A.—Goulard's Extract.

Q.—What is it made from?
A.—Lead acetate, lead oxide, and distilled water.

Q.—Why is the lead oxide used?
A.—To convert the normal acetate into a basic acetate.

Q.—What is the strength of the solution?
A.—It must contain Lead Subacetate corresponding to not less than 18% of Lead.

Q.—Why must freshly boiled distilled water be used in making this preparation?
A.—To expel the carbon dioxide from it, as the carbon dioxide and water would form the insoluble lead carbonate with the soluble lead salt.

Q.—Is this what causes the white insoluble precipitate to form on these shelf bottles?
A.—Yes.

Q.—How may this precipitate be removed?
A.—By the use of acetic acid.

Q.—Is the Solution of Lead Subacetate poisonous?
A.—Yes.

Q.—What is the antidote?
A.—Solutions of magnesium sulphate, then an emetic.

Q.—How does this act as an antidote?
A.—It forms the insoluble lead sulphate, which must be removed from the stomach with an emetic.

Q.—What is the solution therapeutically?
A.—Astringent.

Q.—What particular trouble is frequently treated with it?
A.—Poison ivy poisoning.

Q.—What care should be observed in applying it to raw surfaces?
A.—Not to apply it where large areas have been denuded of skin as sufficient lead may be absorbed to cause poisoning.

Q.—What is the synonym for **Liquor Plumbi Subacetatis Dilutus?**

A.—Lead Water.

Q.—By what other names is it known?

A.—Goulard water; Aqua Saturni; Aqua Plumbi.

Q.—How is it made?

A.—By mixing 4 parts by weight of the solution of lead subacetate with sufficient distilled water to make 100 parts by weight.

Q.—What is the synonym for **Liquor Potassii Arsenitis?**

A.—Fowler's Solution. Liquor Arsenicalis, Fowleri, P. I.

Q.—What do the letters P. I. in this synonym mean?

A.—That the preparation meets the requirements of the preparation of this name in the International Protocol.

Q.—What is it made from?

A.—Arsenic trioxide 1, potassium bicarbonate 2, comp. tinct. of lavender 3, and water sufficient to make 100 parts by weight.

Q.—How is it made?

A.—The arsenic and potassium salt are boiled together with 10% of water until solution takes place. After cooling the compound tincture of lavender is added and the solution filtered.

Q.—Is the solution alkaline or acid in reaction?

A.—Quite strongly alkaline.

Q.—What is the compound tincture of lavender for?

A.—To impart a decided color to the solution so that it will not be mistaken for a nonpotent mixture.

Q.—What color is it?

A.—A pink color.

Q.—What is the strength of the solution?

A.—1%.

Q.—How long may the solution be kept?

A.—It should not be dispensed if it is more than a year old.

Q.—Why is this?

A.—It is slowly oxidized to arsenate which is less active.

Q.—With what is it incompatible?

A.—With solutions of iron.

Q.—What is it therapeutically?
A.—Alterative.

Q.—What is the dose?
A.—0.2 mil.

Q.—How should the preparation be stored?
A.—In amber-colored bottles.

Q.—What is the chemical formula of the salt in Fowler's solution?
A.—K_2HAsO_3.

Q.—By what name is **Liquor Potassii Citratis** called?
A.—Neutral Solution.

Q.—What is it made from?
A.—Potassium bicarbonate and citric acid.

Q.—Is this usually kept in stock?
A.—No, it should be freshly made when needed.

Q.—Why is this?
A.—It soon loses carbon dioxide and is much less palatable.

Q.—What is it therapeutically?
A.—Refrigerant and diuretic.

Q.—What is the dose?
A.—15 mils.

Q.—What percentage of Potassium Citrate must it contain?
A.—8%.

Q.—What is the synonym for **Liquor Sodæ Chlorinatæ**?
A.—Labarraque's solution.

Q.—What is its active constituent?
A.—Chlorine.

Q.—How much Chlorine must it contain?
A.—Not less than 2.5%.

Q.—What is it made from?
A.—Monohydrated sodium carbonate and chlorinated lime.

Q.—What is the by-product which forms?
A.—Calcium carbonate.

Q.—What sodium compound is said to be present in the solution?
A.—Sodium hypochlorite. NaClO.

Q.—What is it used for?
A.—Bleaching agent, disinfectant.

Q.—What National Formulary preparation is like it?
A.—Liquor Potassæ Chlorinatæ. Javelle Water.

Q.—What is the principal difference between them?
A.—The Javelle water is made from Potassium Carbonate instead of Sodium Carbonate.

Q.—How should these preparations be stored?
A.—In well-stoppered bottles, in a cool place, protected from the light.

Q.—What is the strength of **Liquor Zinci Chloridi?**
A.—50%.

Q.—Why is solution of zinc chloride official?
A.—Because the zinc chloride is so very deliquescent it can not be maintained in a solid condition.

Q.—How is the solution made?
A.—It is made by producing zinc chloride by reacting on the metal with hydrochloric acid.

Q.—What else is used in preparing the solution?
A.—Zinc carbonate and nitric acid.

Q.—Why is the nitric acid used?
A.—It oxidizes the iron which may be present as an impurity, to the ferric condition.

Q.—Why is the zinc carbonate used?
A.—This is added to form an insoluble compound with the iron so it may be readily separated.

Q.—What common name has been applied to this solution?
A.—Burnett's fluid.

Q.—Is it poisonous?
A.—Yes.

Q.—What use is made of the solution?
A.—It is a disinfectant.

Q.—What is the synonym for **Liquor Hypophysis?**
A.—Solution of the Pituitary Body.

Q.—What animals furnish the Pituitary Body for this preparation?
A.—Cattle.

Q.—Where is the Pituitary Body located?
A.—At the base of the brain.

Q.—What portion of the body is used in the solution?
A.—The posterior lobe.

Q.—How are the active principles extracted?
A.—By finely mincing the lobe, then extracting with acidulated water.

Q.—What is further done?
A.—The solution is boiled for ten minutes and filtered.

Q.—What is it therapeutically?
A.—Stimulant to involuntary muscle.

Q.—What is the dose?
A.—1 mil.

NATIONAL FORMULARY LIQUORES

Q.—Name the N. F. Liquores made by Simple Solution.
A.—Liquor Antisepticus.
Antisepticus Alkalinus.
Bismuthi.
Bromi.
Carmini.
Cocci.
Guttæ-Perchæ.
Hydrargyri et Potassii Iodidi.
Hydrastinæ Compositus.
Hypophosphitum.
Hypophosphitum Compositum.
Iodi Phenolatus.
Pancreatini.
Pepsini.
Pepsini Antisepticus.
Pepsini Aromaticus.
Phosphori.

Picis Alkalinus.
Picis Carbonis.
Sodæ et Menthæ.
Sodii Arsenatis, Pearson.
Sodii Boratis Compositus.
Sodii Phosphatis Compositus.
Strychninæ Acetatis.
Zinci et Alumini Compositus.
Zinci et Ferri Compositus.

Q.—Name the N. F. Liquores made by Chemical Reaction.

A.—Liquor Alumini Acetatis.
Alumini Acetico-Tartratis.
Alumini Subacetatis.
Ammonii Citratis.
Arsenicalis, Clemens.
Auri et Arseni Bromidi.
Calcis Sulphuratæ.
Chlori Compositus.
Ferri Acetatis.
Ferri Albuminati.
Ferri Citratis.
Ferri Hypophosphitis.
Ferri Nitratis.
Ferri Oxychloridi.
Ferri Oxysulphatis.
Ferri Peptonati.
Ferri Peptonati et Mangani.
Ferri Protochloridi.
Ferri Salicylatis.
Hydrargyri Nitratis.
Magnesii Sulphatis Effervescens.
Phosphatum Acidus.
Phosphatum Compositus.
Potassæ Chlorinatæ.
Sodii Citratis.
Sodii Citro-Tartratis Effervescens.

Q.—What are the synonyms for **Liq. Alumini Acetatis?**

A.—Burow's Solution. Liquor Burowii.

Q.—What is it therapeutically?

A.—Astringent and disinfectant.

Q.—What is its strength?
A.—Must contain 5% of aluminum acetate.

Q.—What is **Liq. Alumini Acetico-Tartratis?**
A.—A nontoxic antiseptic and astringent.

Q.—Why is Precipitated Calcium Carbonate used in making **Liq. Alumini Subacetatis?**
A.—This with the Acetic Acid forms Calcium Acetate and when this reacts with the Solution of Aluminum Sulphate, there is formed the solution of Aluminum Acetate and the by-product is insoluble Calcium Sulphate which may be easily separated.

Q.—What is the strength of this solution?
A.—Not less than 7.5% nor more than 8% of basic Aluminum Acetate.

Q.—What is the specific gravity?
A.—1.045.

Q.—What "trade" preparation is similar to **Liq. Antisepticus?**
A.—Listerine.

Q.—In what striking particular does this Liquor differ from the accepted definition for Liquores?
A.—It contains 30% of alcohol.

Q.—How does the solution react with litmus?
A.—It is neutral or slightly acid.

Q.—What is the dose?
A.—4 mils.

Q.—What "trade" preparation is like **Liquor Antisepticus Alkalinus?**
A.—Glycothymoline.

Q.—Explain the reaction which occurs when this preparation is made.
A.—The glycerin and sodium borate form glyceryl borate which immediately hydrolyzes forming free boric acid and this reacts with the potassium bicarbonate releasing carbon dioxide.

Q.—What is the principal use made of the solution?
A.—As nasal douche and gargle.

Q.—Give the synonym for Clemen's Solution of Arsenic.
A.—**Solution of Potassium Arsenate and Bromide.**

Q.—What is it made from?
A.—Arsenic trioxide, potassium bicarbonate, bromine, and water.

Q.—What is the strength of the solution?
A.—Equivalent to 1% arsenic trioxide.

Q.—What is the dose?
A.—0.2 mils.

Q.—What "trade" preparation is similar to **Liq. Auri et Arseni Bromidi?**
A.—Arsenauro.

Q.—What is it therapeutically?
A.—Alterative and stimulant.

Q.—What is the dose?
A.—0.2 mil.

Q.—What form of Bismuth is used in making the **Liquor Bismuthi?**
A.—The glycerite of bismuth.

Q.—How much alcohol does the preparation contain?
A.—12.5%.

Q.—What is the dose?
A.—4 mils.

Q.—What is the synonym for **Liquor Bromi?**
A.—Smith's Solution of Bromine.

Q.—How much Bromine does it contain?
A.—8.3%.

Q.—What else is there in it?
A.—Potassium Bromide.

Q.—What is the solution therapeutically?
A.—Alterative and counter-irritant.

Q.—How should it be stored?
A.—In a glass-stoppered bottle in a cool place.

Q.—What is the English title for **Liquor Calcis Sulphuratæ?**
A.—Solution of Sulphurated Lime.

Q.—What is the synonym?
A.—Vleminckx's Solution. Solution of Oxysulphuret of Lime.

Q.—What is it made from?
A.—Calcium oxide, sublimed sulphur, and water.

Q.—How is the solution prepared?
A.—The lime is slaked, then mixed with water and the sulphur, then all are boiled together for 1 hour, after which the solution is strained and later decanted.

Q.—What use is made of the solution?
A.—External application in many skin diseases.

Q.—How much Carmine is there in **Liquor Carmini?**
A.—6.5%.

Q.—What else is there in the Solution?
A.—Glycerin and ammonia water.

Q.—What is the object of the ammonia water?
A.—It renders the carmine soluble.

Q.—What is the Solution used for?
A.—As a coloring solution.

Q.—Does it color acid and alkaline solutions equally well?
A.—No, it should not be used to color acid solutions as acids tend to precipitate the carmine.

Q.—What is the synonym for **Liquor Chlori Compositus?**
A.—Chlorine water.

Q.—How is it prepared?
A.—By decomposing Potassium Chlorate with Hydrochloric Acid in the presence of water, then dissolving the resulting chlorine in cold water.

Q.—What is the strength of the solution?
A.—0.35% of chlorine.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is the dose?
A.—4 mils.

Q.—What does the N. F. direct about dispensing it?
A.—It is not to be dispensed unless it has been recently made and then only in well-filled amber-colored bottles.

Q.—In making this solution, will it do to first dissolve the potassium chlorate in water, then add the hydrochloric acid?

A.—No, for then it forms only an acid solution of potassium chlorate.

Q.—What is the English title for **Liquor Cocci?**

A.—Cochineal Color.

Q.—What use is made of it?

A.—Used as coloring solution.

Q.—What is the strength of **Liquor Ferri Acetatis?**

A.—31% of anhydrous ferric acetate, 7.5% metallic iron.

Q.—How is it made?

A.—Solution of ferric sulphate and ammonia water are first mixed to form ferric hydroxide, then the ferric hydroxide is dissolved in glacial acetic acid.

Q.—What is the dose of the solution?

A.—0.3 mil or 5 minims.

Q.—What is the source of the albumen used in making **Liquor Ferri Albuminati?**

A.—It is fresh egg albumen.

Q.—What form of iron is used?

A.—Solution of ferric oxychloride.

Q.—Why is sodium citrate used in this preparation?

A.—To make the iron albumate formed, go into solution.

Q.—Why does the sodium citrate have this effect?

A.—Because of the slight alkalinity of its solution. And it is not sufficiently alkaline to impart a disagreeable flavor to the preparation.

Q.—What is the Solution therapeutically?

A.—Tonic and hæmatinic.

Q.—What is the dose?

A.—8 mils or 2 drachms.

Q.—What is the strength of **Liquor Ferri Citratis?**

A.—Contains the equivalent of 7.25% metallic iron.

Q.—What is the dose?

A.—0.6 mil or 10 minims.

Q.—Is **Liquor Ferri Hypophosphitis** made in the same manner as most of the other iron solutions?

A.—No this is made directly from Ferric Hypophosphite.

Q.—What else is used in the solution?

A.—Potassium Citrate.

Q.—What is the Potassium Citrate for?

A.—To help the solubility of the ferric hypophosphite.

Q.—What is the dose?

A.—1 mil or 15 minims.

Q.—What is the strength of **Liquor Ferri Nitratis?**

A.—Not less than 1.3% of metallic iron.

Q.—In washing the precipitate in making this preparation, why are the washings tested with barium chloride Test Solution?

A.—To be sure that all ammonium sulphate is out.

Q.—What is the dose of the solution?

A.—0.3 mil or 5 minims.

Q.—In making **Liquor Ferri Oxychloridi,** why is the precipitate first formed washed until the washings give only a slight opalescence with silver nitrate T. S.?

A.—To be sure that all the ammonium chloride is washed out.

Q.—Why must the solution be protected from the sunlight?

A.—The sunlight would reduce it to a ferrous compound.

Q.—What is the dose of the solution?

A.—2 mils or 30 minims.

Q.—In making **Liquor Ferri Oxysulphatis,** why is it made directly from Ferrous Sulphate and not after the manner of making Liq. Ferri Oxychloridi?

A.—Because Ferrous Sulphate is a common article of the market and ferric or ferrous chloride is not.

Q.—Why is Nitric Acid used in the preparation?

A.—To oxidize the ferrous iron to the ferric condition.

Q.—Why are Hydrochloric Acid and Pepsin used in making **Liquor Ferri Peptonati?**

A.—For the purpose of converting the Fresh Egg Albumen into Peptonate.

Q.—What form of iron is used in this preparation?
A.—Solution of Ferric Oxychloride.

Q.—Why is the peptone filtrate neutralized with sodium hydroxide just before adding the iron solution?
A.—Because an acid solution of peptone will not form a soluble compound with iron.

Q.—What is the dose of the solution?
A.—8 mils or 2 fluidrachms.

Q.—How does **Liquor Ferri Peptonati et Mangani** differ from the preceding Liquor?
A.—Only that it contains in addition 0.4% soluble manganese citrate.

Q.—What form of Iron is used in preparing **Liquor Ferri Protochloridi?**
A.—Metallic iron in the form of fine, bright wire.

Q.—What is the name given to Iron in this form?
A.—Card teeth.

Q.—Why is this form used instead of Reduced Iron?
A.—It is said to have a greater degree of purity.

Q.—Is the Protochloride a ferrous or ferric iron?
A.—A ferrous iron.

Q.—What is the color of the solution?
A.—Green.

Q.—What is Diluted Hypophosphorous Acid used in the solution for?
A.—To protect the iron against oxidation.

Q.—What is the dose?
A.—0.6 mil or 10 minims.

Q.—What form of iron is used in **Liquor Ferri Salicylatis?**
A.—Tincture of Ferric Citro-Chloride.

Q.—What Salicylate is used in making the preparation?
A.—Sodium Salicylate.

Q.—What is the synonym for this liquor?
A.—Salicylated Mixture of Iron.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What is the solvent in **Liquor Guttæ Perchæ?**
A.—Chloroform.

Q.—How much Gutta Percha is in the solution?
A.—15%.

Q.—What else is used in the Solution?
A.—Lead Carbonate.

Q.—What is this used for?
A.—To clarify the solution.

Q.—Is the solution a thin mobile one?
A.—No, it is rather inclined to be sticky.

Q.—What is Gutta Percha?
A.—A coagulated milky exudate from trees, somewhat resembling rubber.

Q.—What are the synonyms for **Liquor Hydrargyri et Potassii Iodidi?**
A.—Channing's Solution. Solution of Potassium Iodohydrargyrate.

Q.—What does it contain?
A.—1% of mercuric iodide and 0.8% potassium iodide.

Q.—Is mercuric iodide soluble in water?
A.—No.

Q.—Then how is it possible to have it in solution in this preparation?
A.—It is soluble in a solution of a soluble iodide and this is the case here, as potassium iodide is very soluble.

Q.—What is the dose?
A.—0.2 mil or 3 minims.

Q.—What is used in making **Liquor Hydrargyri Nitratis?**
A.—Red mercuric oxide and nitric acid and water.

Q.—What is the strength of the solution?
A.—60% anhydrous mercuric nitrate and 11% free nitric acid.

Q.—What use is made of the solution?
A.—Caustic.

Q.—How must it be kept?
A.—In glass-stoppered bottles.

Q.—What is the synonym for **Liquor Hydrastinæ Compositus?**
A.—Colorless Hydrastine Solution.

Q.—What is there in the solution?
A.—Hydrastine Hydrochloride, Aluminum Chloride, Calcium Chloride, and Magnesium Chloride, each 0.3%, Potassium Chloride, 0.1%, Glycerin 50%, and Water to make 100%.

Q.—What is it therapeutically?
A.—Slightly astringent.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What hypophosphites are used in **Liquor Hypophosphitum?**
A.—Calcium, Potassium and Sodium Hypophosphites, together with Hypophosphorous Acid.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What additional medicinal agents are used in the **Liquor Hypophosphitum Compositus?**
A.—Ferric, Manganese and Quinine Hypophosphites, Strychnine, and Potassium Citrate.

Q.—What is the Potassium Citrate for?
A.—To get the Ferric and Manganese Hypophosphites into solution.

Q.—What is the dose of the solution?
A.—4 mils or 1 fluidrachm.

Q.—What are these Solutions therapeutically?
A.—Nutrient, tonic and alterative.

Q.—What are the synonyms for **Liquor Iodi Phenolatus?**
A.—Carbolized Solution of Iodine; Boulton's Solution; French Mixture.

Q.—What is there in the mixture?
A.—Compound Solution of Iodine, Liquefied Phenol, Glycerin, and Water.

Q.—After mixing the ingredients, what is done with the preparation?
A.—It is exposed to the sunlight until it has become colorless.

Q.—What use is made of the solution?
A.—It is used externally as an antiseptic and irritant.

Q.—What common name is sometimes applied to **Liquor Magnesii Sulphatis Effervescens?**
A.—Purgative Lemonade.

Q.—What U. S. P. preparation does it resemble?
A.—Liquor Magnesii Citratis.

Q.—What is the particular difference between these two Solutions?
A.—Magnesium Sulphate which is cheaper than the Carbonate is used and a much smaller quantity of Citric Acid is used in the N. F. preparation which of course materially reduces the cost.

Q.—What is it therapeutically?
A.—A refrigerant purgative.

Q.—What is the dose?
A.—The contents of one bottle, 350 mils.

Q.—How much Pancreatin is there in **Solution of Pancreatin?**
A.—1.75%.

Q.—Why is there Sodium Bicarbonate in the solution?
A.—Because Pancreatin acts best in a faintly alkaline solution.

Q.—Why is Magnesium Carbonate used in preparing this solution?
A.—As a clarifying agent.

Q.—What is the solution therapeutically?
A.—An intestinal digestive.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What form of Pepsin is used in making **Liquor Pepsini?**
A.—Glycerite of Pepsin, 5%.

Q.—Why is there Hydrochloric Acid in this preparation?
A.—Pepsin acts best in slightly acid medium.

Q.—What is the Solution therapeutically?
A.—A digestive.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—How is **Liquor Pepsini Antisepticus** used?
A.—As an external application for indolent ulcers.

Q.—What is its strength in Pepsin?
A.—5%.

Q.—What percentage of Pepsin in **Liquor Pepsini Aromaticus?**
A.—1.75%.

Q.—What aromatics are used in it?
A.—Volatile oils of Cinnamon, Pimenta, and Clove.

Q.—What is the preparation therapeutically?
A.—Digestive.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What is the English title for **Liquor Phosphatum Acidus?**
A.—Acid Solution of Phosphates.

Q.—What is used in making it?
A.—Precipitated Calcium Phosphate, Magnesium Carbonate, Phosphoric Acid, and Distilled water.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the English name for **Liquor Phosphatum Compositus?**
A.—Compound Solution of Phosphates.

Q.—What is there in it?
A.—Precipitated calcium phosphate 7%; ferric phosphate and ammonium phosphate, each 3.5%; potassium bicarbonate and sodium bicarbonate each 0.8%; citric acid 16.4%; glycerin 37.5%; phosphoric acid 14%; orange flower water 25% and distilled water to 100%.

Q.—Why does the N. F. give no dose for this preparation?
A.—This solution is not intended to be administered as it stands. It provides a solution of phosphates which may be added to syrup to be mixed at the time of dispensing because syrups containing free acid will char the sugar upon standing, as in stock solutions.

Q.—What is the synonym for **Liquor Phosphori?**
A.—Thompson's Solution of Phosphorus.

Q.—What is the strength of the solution?
A.—0.07%.

Q.—What liquids are used in the solution?
A.—The Phosphorus is dissolved by heat in Dehydrated Alcohol, then Glycerin is added to the solution.

Q.—How must the Phosphorus be weighed?
A.—Under water in a watch-glass.

Q.—Why must it be weighed under water?
A.—Because it oxidizes so rapidly in the air that it will take fire.

Q.—What is the solution flavored with?
A.—Spirit of Peppermint.

Q.—What is it therapeutically?
A.—Nerve stimulant.

Q.—What is the dose of the solution?
A.—0.6 mil or 10 minims.

Q.—What is the English name for **Liquor Picis Alkalinus?**
A.—Alkaline Solution of Tar.

Q.—What is the strength in Tar?
A.—25%

Q.—What kind of Tar is used?
A.—Wood Tar.

Q.—What alkali is used?
A.—Potassium Hydroxide.

Q.—What use is made of the solution?
A.—A stimulating antiseptic in skin diseases.

Q.—What is the English name for **Liquor Picis Carbonis?**
A.—Coal Tar Solution.

Q.—What else is in the solution?
A.—Quillaja and Alcohol.

Q.—What is the common name for Quillaja?
A.—Soap bark or Soaptree bark.

Q.—What "trade name" has been applied to this solution?
A.—Liquor Carbonis Detergens.

Q.—What is it used for?
A.—An external application in skin diseases.

Q.—What is the synonym for **Liquor Potassæ Chlorinatæ?**
A.—Javelle Water.

Q.—What is it used for?
A.—Largely as a bleaching agent, to remove stains from linen.

Q.—Is Chlorine a bleaching agent?
A.—Only indirectly. Its great affinity for hydrogen causes it to decompose water, thus releasing oxygen which is the real bleaching agent.

Q.—What is the synonym for **Liquor Sodæ et Menthæ?**
A.—Soda Mint.

Q.—What is it made from?
A.—Sodium Bicarbonate, Aromatic Spirit of Ammonia, and Spearmint Water.

Q.—May Peppermint Water be used in place of Spearmint?
A.—Yes, the N. F. gives this alternative.

Q.—What is it therapeutically?
A.—Carminative and antacid.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What is the synonym for **Liquor Sodii Arsenatis, Pearson?**
A.—Liquor Arsenicalis Pearsonii.

Q.—What is it made from?
A.—Dried Sodium Arsenate.

Q.—What is the strength?
A.—0.1%.

Q.—How does this strength compare with the U. S. P. Liq. Sodii Arsenatis?
A.—It is only one-tenth as strong.

Q.—What is the dose of the solution?
A.—2 mils or 30 minims.

Q.—What is it therapeutically?
A.—Alterative.

Q.—What is the synonym for **Liquor Sodii Boratis Compositus?**
A.—Dobell's Solution.

Q.—What is used in the solution?
A.—Sodium Borate, Sodium Bicarbonate, Liquefied Phenol, Glycerin, and Water.

Q.—What causes the effervescence when the solution is being prepared?
A.—The sodium borate and the glycerin react to form glyceryl borate, the water immediately breaks this down forming glycerin and free boric acid, then the free boric acid attacks the sodium bicarbonate releasing carbon dioxide.

Q.—What is the solution used for?
A.—Used as an alkaline nasal spray or douche.

Q.—Give the synonym for **Liquor Sodii Citratis?**
A.—Potio Riverii.

Q.—What does the N. F. direct about dispensing this solution?
A.—It is not to be dispensed unless recently prepared.

Q.—Why is this?
A.—It contains carbon dioxide, as the solution stands this is lost and the preparation becomes "flat".

Q.—What is it therapeutically?
A.—Refrigerant and diaphoretic.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What common name is sometimes given to **Liquor Sodii Citro-Tartratis Effervescens?**
A.—Purgative Lemonade.

Q.—From what is the solution made?
A.—Sodium Bicarbonate, Tartaric Acid, Citric Acid, Syrup of Citric Acid, and Water.

Q.—What gives the effervescence to the solution?
A.—The last 2 Gm. of sodium bicarbonate is decomposed by the acid releasing carbon dioxide.

Q.—What is the solution therapeutically?
A.—Purgative or laxative.

Q.—What is the dose?
A.—The contents of one bottle.

Q.—What "trade preparation" is similar to **Liquor Sodii Phosphatis Compositus?**
A.—Melachol.

Q.—What is the strength of the solution in Sodium Phosphate?
A.—100%.

Q.—What kind of Sodium Phosphate is used in making the solution?
A.—Only that containing the full 12 molecules of water which the salt naturally crystallizes with.

Q.—Why does it liquefy when heated with the citric acid?
A.—Water of crystallization is liberated and the salts dissolve in this water.

Q.—What is the particular value of the Citric Acid?
A.—It forms some Acid Sodium Citrate which prevents the salt crystallizing out.

Q.—What is the glycerin for?
A.—It also tends to prevent crystallization and acts to prevent the formation of growths in the solution.

Q.—What is it therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—Give the synonym for **Liquor Strychninæ Acetatis.**
A.—Hall's Solution of Strychnine.

Q.—How much Strychnine does it contain?
A.—0.178%

Q.—What is the color of the solution?
A.—Reddish.

Q.—What gives it the color?
A.—Compound tincture of cardamom.

Q.—What is the solution therapeutically?
A.—Nervine and stomachic.

Q.—What is the dose?
A.—0.6 mil or 10 minims.

Q.—What is there in **Liquor Zinci et Alumini Compositus?**
A.—Zinc Sulphate, Aluminum Sulphate, Betanaphthol, Oil of Thyme, and Water.

Q.—What is the solution used for?
A.—Antiseptic and deodorant.

Q.—What is the synonym for **Liquor Zinci et Ferri Compositus?**
A.—Deodorant Solution.

Q.—What is used in the solution?
A.—Zinc Sulphate, Ferrous Sulphate, Copper Sulphate, Betanaphthol, Oil of Thyme, Hypophosphorous Acid, and Water.

SPIRITUS—SPIRITS

Q.—Define Spirits.
A.—Solutions of volatile substances in alcohol.

Q.—By what processes are the Spirits made?
A.—By simple solution and chemical reaction and solution.

Q.—What is the difference between Waters and Spirits?
A.—Waters are solutions of Volatile substances in Water while Spirits are solutions of Volatile substances in Alcohol.

Q.—Are the same volatile substances used in the Spirits that are used in the Waters?
A.—In a number of cases they are the same.

Q.—Are the Spirits in such cases stronger or weaker than the Waters?
A.—Stronger, because the alcohol is generally a much better solvent for the substance than the water.

Q.—How many Spirits are official in the U. S. P.?
A.—15.

Q.—Name those made by Simple Solution.
A.—Spiritus Ætheris.
Amygdalæ Amaræ.
Anisi.
Aurantii Compositus.
Chloroformi.
Cinnamomi.

Juniperi.
Juniperi Compositus.
Lavendulæ.
Menthæ Piperitæ.
Menthæ Viridis.

Q.—Name those made by Chemical Reaction.
A.—Spiritus Ætheris Nitrosi.
Ammoniæ Aromaticus.
Glycerylis Nitratis.

Q.—What is the strength of **Spiritus Aetheris?**
A.—32.5% ether.

Q.—What is it therapeutically?
A.—Antispasmodic, stimulant, carminative.

Q.—What is the synonym for Spt. Ætheris?
A.—Hoffmann's Drops.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the strength of **Spiritus Amygdalæ Amaræ?**
A.—One per cent.

Q.—How much water does this Spirit contain?
A.—20%.

Q.—What is the active constituent in oil of bitter almond?
A.—Hydrocyanic acid.

Q.—Is this acid poisonous?
A.—Yes, extremely so.

Q.—What note of precaution does the U. S. P. give on this Spirit?
A.—That it is intended only for medicinal use and must not be used for flavoring foods.

Q.—What is the Spirit therapeutically?
A.—Sedative.

Q.—Into what other preparation does it enter?
A.—Syrup of Almond.

Q.—What is the dose of the Spirit?
A.—0.5 mil or 8 minims.

Q.—What is the strength of **Spiritus Anisi?**
A.—10% oil of anise.

Q.—What is it used for?
A.—Carminative and flavor.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is there in **Spiritus Aurantii Compositus?**
A.—20% oil of orange, 5% oil of lemon, 2% oil of coriander, 0.5% oil of anise.

Q.—What use is made of this Spirit?
A.—Entirely as a flavor, particularly for Elixir Aromaticum.

Q.—What is the strength of **Spiritus Camphoræ?**
A.—10%.

Q.—What is it therapeutically?
A.—Externally, irritant and antiseptic, internally, carminative, stomachic, stimulant.

Q.—What is the dose?
A.—1 mil or 15 minims.

Q.—By what other name has **Spiritus Chloroformi** been called?
A.—Chloric ether.

Q.—What is the strength of the Spirit?
A.—6%.

Q.—What is it therapeutically?
A.—Antispasmodic, antiemetic.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is the strength of **Spirit of Cinnamon?**
A.—10%.

Q.—What is it therapeutically?
A.—Carminative, flavor.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is the strength of **Spiritus Juniperi?**
A.—5%.

Q.—What is it used for?
A.—As an addition to diuretic mixtures.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is there in **Spiritus Juniperi Compositus?**
A.—Oil of juniper, 0.4%, oil of caraway and fennel, each 0.05%, water about 30%, and alcohol.

Q.—What is it therapeutically?
A.—Diuretic.

Q.—What is the dose?
A.—10 mils or 2½ fluidrachms.

Q.—What is the strength of **Spiritus Lavendulæ?**
A.—5%.

Q.—Into what preparation does this enter?
A.—Mistura Ferri Compositus.

Q.—What is the strength of **Spiritus Menthæ Piperitæ?**
A.—10%.

Q.—What is the synonym?
A.—Essence of Peppermint.

Q.—What is there in the preparation besides the oil and alcohol.
A.—1% of the herb is allowed to macerate 6 hours then filtered out.

Q.—What are the herb or leaves for?
A.—So the alcohol may extract the color (chlorophyl) and impart a green color to the Spirit.

Q.—Why are the leaves first macerated in water?
A.—The water removes a yellow color which is not desirable in the Spirit.

Q.—How is it to be preserved?
A.—In amber-colored bottles.

Q.—What is it therapeutically?
A.—Carminative. Flavor.

Q.—How is it best administered?
A.—On sugar or mixed with sweetened water.

Q.—What is the English name for **Spiritus Menthæ Viridis?**
A.—Spirit of Spearmint.

Q.—How is it prepared?
A.—10% oil, 1% herb, and alcohol to 100%.

Q.—What is the active constituent in **Spiritus Ætheris Nitrosi?**
A.—Ethyl nitrite.

Q.—How much must it contain?
A.—4%.

Q.—How is the ethyl nitrite produced?
A.—Reaction between sodium nitrite, sulphuric acid and ethyl alcohol.

Q.—Why is the freshly formed ethyl nitrite washed with cold water?
A.—To wash out any uncombined alcohol.

Q.—What is the monohydrated sodium carbonate for?
A.—It neutralizes any sulphuric acid which remains forming sodium sulphate which is readily washed out.

Q.—What is the freshly heated potassium carbonate for?
A.—To remove the last traces of water from the ethyl nitrite.

Q.—Why does the U. S. P. direct the ethyl nitrite be poured into a tared bottle of alcohol before being weighed?
A.—Because it is so very volatile that some would be lost if it was weighed without such dilution.

Q.—Why must it be kept in small well-filled bottles protected from the light?
A.—It is very volatile, light splits it into alcohol and nitrous acid. It is also said that there is some aldehyde present and contact with the oxygen of the air converts this to acetic acid.

Q.—What is it therapeutically?
A.—Diuretic and diaphoretic.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What happens when it is mixed with Antipyrine?
A.—Usually a green color develops.

Q.—What is formed to give the green color?
A.—Iso-nitroso antipyrine.

Q.—Is it all right to dispense such a mixture?

A.—Yes, it was formerly thought that it was poisonous, but it was proved not to be so.

Q.—Why does this color develop?

A.—Because of the acidity of the Spirit of Nitrous Ether.

Q.—What is used in making **Spiritus Ammoniæ Aromaticus?**

A.—Ammonium Carbonate, Ammonia Water, Oils of Lemon, Lavender and Myristica, Alcohol, and Water.

Q.—Why is the Ammonium Carbonate allowed to stand in the Ammonia Water and Water for 12 hours?

A.—To convert the U. S. P. Ammonium Carbonate to the normal carbonate.

Q.—What is the U. S. P. Ammonium Carbonate?

A.—Each molecule contains, a molecule of Ammonium Bicarbonate (NH_4HCO_3) and a molecule of Ammonium Carbamate ($NH_4NH_2CO_2$).

Q.—Give the full chemical formula for U. S. P. Ammonium Carbonate.

A.—$NH_4HCO_3.NH_4NH_2CO_2$.

Q.—Why is it necessary that the U. S. P. carbonate be converted to the true carbonate?

A.—Because the U. S. P. carbonate is not soluble in alcohol but the normal carbonate is.

Q.—Why is the solution allowed to stand in the alcohol 24 hours before being filtered?

A.—So if there is any salt that has not been converted into carbonate it may be precipitated and filtered out.

Q.—Why does the U. S. P. require the carbonate to be in "translucent" pieces?

A.—It is only this kind which will give the desired weight of the salt.

Q.—What is the matter with the powdery, opaque kind?

A.—It has lost ammonia and carbon dioxide and consists almost wholly of the acid carbonate.

Q.—What causes the yellow color to develop?

A.—The action of the alkaline ammonia on the volatile oils, and there are impurities in the alcohol that also are colored by

the action of the ammonia. If the Spirit is kept in cork-stoppered bottles it is colored more rapidly.

Q.—Does this color make it unfit for use?
A.—No, it does not impair the medicinal value at all.

Q.—What is the Spirit therapeutically?
A.—Stimulant and antacid, carminative.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—How should it be given?
A.—Mixed with three or four times as much water.

Q.—What is the English name for **Spiritus Glycerylis Nitratis**?
A.—Spirit of Glyceryl Trinitrate.

Q.—What are the synonyms?
A.—Spirit of Glonoin; Spirit of Nitroglycerin.

Q.—What is the strength of the preparation?
A.—1% of glyceryl trinitrate.

Q.—Why must great care be used in handling and dispensing this preparation?
A.—If it is spilled or if any considerable portion of the alcohol is lost by evaporation, explosion is likely to result.

Q.—What must be done if it is accidentally spilled?
A.—Pour over it a solution of Potassium Hydroxide which will partially decompose it.

Q.—Why must caution be used in tasting it?
A.—Even small quantities are liable to produce severe headache.

Q.—Why must care be used not to get it on the skin?
A.—Sufficient is easily absorbed to produce violent headache.

Q.—What is it therapeutically?
A.—Vasodilator. Used to lower high blood pressure.

Q.—What is the dose?
A.—0.05 mil or 1 minim.

Q.—Does this severe headache always occur when it is used?
A.—Yes, but it is found to disappear with repeated use of the Spirit.

Q.—How is nitroglycerin made?
A.—By slowly dropping glycerin into a well-cooled mixture of nitric and sulphuric acids.

N. F.
SPIRITUS—SPIRITS

Q.—What are the synonyms for **Spiritus Acidi Formici?**
A.—Spiritus Formicarum. Spirit of Ants.

Q.—What is its strength?
A.—4% of formic acid.

Q.—What is it therapeutically?
A.—Externally, rubefacient, internally irritant diuretic.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the synonym for **Spiritus Ætheris Compositus?**
A.—Hoffmann's Anodyne.

Q.—What is there in the preparation?
A.—Ether 32.5%; Ethereal Oil 2.5%; Alcohol 65%.

Q.—What is it therapeutically?
A.—Carminative and antispasmodic.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—By what name was **Spiritus Ammoniæ Anisatus** formerly official?
A.—Liquor Ammoniæ Anisatus.

Q.—What is it therapeutically?
A.—Carminative and mild sedative.

Q.—What is the dose?
A.—1 mil or 15 minims.

Q.—What is in the preparation?
A.—3% anethol, 20% ammonia water, and alcohol.

Q.—What particular use is made of **Spiritus Cardamomi Compositus?**
A.—For preparing the Elixir of the same name.

Q.—What volatile oils does it contain?
A.—Cardamom, orange, cinnamon, clove, caraway, and also anethol.

Q.—What common name has been applied to **Spiritus Myrciæ Compositus?**
A.—Bay Rum.

Q.—What use is made of it?
A.—Used entirely as a toilet preparation.

Q.—What does it contain?
A.—Oils of Myrcia, Orange and Pimenta, 61% of Alcohol and Water.

Q.—What is the English name for **Spiritus Odoratus?**
A.—Perfumed Spirit.

Q.—What common name has been applied to it?
A.—Cologne Water.

Q.—What is the English name for **Spiritus Oleorum Volatilium?**
A.—Spirits of Volatile Oils.

Q.—What is the object of the formula?
A.—To provide a formula for a spirit made from a volatile oil, when no other formula is provided.

Q.—What is the formula?
A.—6.5% of the volatile oil and 93.5% alcohol.

Q.—What is there in **Spiritus Vanillini Compositus?**
A.—Vanillin 2%, oils of orange, cardamom and cinnamon, and about 94% alcohol.

Q.—What is the principal use of this Spirit?
A.—Used as a flavor in preparing an Elixir of the same name.

Q.—How must this Spirit be stored?
A.—In tightly-stoppered, amber-colored bottles, in a cool place protected from the light.

NEBULÆ—SPRAYS

Q.—What are Nebulæ?
A.—Solutions of organic antiseptics in Light Liquid Petrolatum.

Q.—How are they administered?
A.—Usually by spraying the affected part with the solution in a nebulizer or oil atomizer.

Q.—Are there any of these preparations in the U. S. P.?
A.—No, the formulas are given in the N. F. only.

Q.—How many are official?
A.—Five.

Q.—Name them.
A.—Nebula Aromatica; Mentholis; Eucalyptolis; Mentholis Composita; Thymolis.

Q.—What is there in Nebula Aromatica?
A.—Phenol, Menthol, Eucalyptol, Oil of Cinnamon, Oil of Clove, each 0.2%; Thymol 0.1%, Camphor and Benzoic Acid 0.3%, Methyl Salicylate 0.5%.

PETROXOLINA—PETROXOLINS

Q.—What are Petroxolins?
A.—Preparations for external use made by dissolving medicinal substances in Petroxolin.

Q.—What is Petroxolin?
A.—A solution of Liquid Petrolatum or Petrolatum in an Ammonium soap made by the reaction between Ammonia Water and Oleic Acid.

Q.—Give ingredients and method for making **Petroxolinum Liquidum.**
A.—Light Liquid Petrolatum 50%, Oleic Acid 28%, Oil of Lavender 2%, Stronger Ammonia Water 5%, Alcohol 15%. Mix the Liquid Petrolatum, Oleic Acid Alcohol and Ammonia Water in a flask. The mixture is then heated on the water-bath until it becomes clear; after cooling add the oil of lavender.

Q.—Give the formula and process for making **Petroxolinum Spissum.**
A.—White wax 35%, Light Liquid Petrolatum 20%, Oleic Acid 32%, Oil of Lavender 3%, Alcohol 5%, Stronger Ammonia Water 5%. Melt the white wax and liquid petrolatum on the water-bath, add the oleic acid, transfer the mixture at once to a warm mortar. Immediately add the mixed alcohol and stronger ammonia water, stir continuously until cool, then add the oil of lavender.

Q.—Name the official Petroxolins.

A.—Petroxolinum Betanaphtholis.
Petroxolinum Liquidum.
Cadini.
Chloroformi Camphoratum.
Creosoti.
Eucalyptolis.
Guaiacolis.
Hydrargyri.
Iodi.
Iodi Dilutum.
Iodoformi.
Mentholis.
Methylis Salicylatis.
Phenolis.
Phenolis Camphoratum.
Picis.
Spissum.
Sulphuratum.
Sulphuratum Compositum.
Terebinthinæ Laricis.

Q.—What is the synonym for Petroxolinum?

A.—Petrox.

Q.—Why are these said to be of more value than other preparations carrying the same medicaments?

A.—It is said that the medicinal substance is more readily absorbed.

Q.—What is the strength of **Betanaphthol Petrox?**

A.—10%.

Q.—Is this to be carried in stock?

A.—No, it must always be freshly made.

Q.—What is the strength of **Cade Petrox?**

A.—25%.

Q.—What is in **Camphor and Chloroform Petrox?**

A.—25% each of camphor and chloroform, 50% liquid petrox.

Q.—What is in **Creosote Petrox?**

A.—20% Creosote, 5% Oleic Acid, 75% Liquid Petrox.

Q.—What is there in **Petroxolinum Eucalyptolis?**

A.—Eucalyptol 20%, liquid petroxolin 80%.

Q.—What is there in Guaiacol Petrox?
A.—Guaiacol 20%; oleic acid 5%, liquid petroxolin 75%.

Q.—What is there in **Mercury Petrox?**
A.—Metallic mercury 30%, lanolin 13%, oleic acid 2%, solid petroxolin 55%.

Q.—How is it put together?
A.—The mercury is rubbed with a mixture of the oleic acid and the lanolin, then the solid petrox is added.

Q.—How fine must the mercury be?
A.—So fine that the globules are not visible under a lens magnifying 10 diameters.

Q.—How many Petroxolins are there which contain Iodine?
A.—Two.

Q.—How is each designated?
A.—Petroxolinum Iodi; Petroxolinum Iodi Dilutum.

Q.—What is the strength of each?
A.—5% and 10%.

Q.—What does **Iodine Petrox** contain?
A.—Iodine 10%, oleic acid 40%, alcohol 20%, light liquid petrolatum 23%, oil of lavender 2%, and stronger ammonia water 5%.

Q.—Why is it not made directly from iodine and liquid petroxolin?
A.—It has been found that the liquid petroxolin can not hold 10% of iodine without being fortified.

Q.—How is the **Iodine Petrox** 5% prepared?
A.—By simply mixing the iodine and liquid petroxolin in a stoppered bottle.

Q.—What is the official title for the Iodine Petrox 5%?
A.—Petroxolinum Iodi Dilutum.

Q.—What is the strength of **Iodoform Petrox?**
A.—3%.

Q.—What else is there in this preparation?
A.—20% acetone, 10% oleic acid, 3% eucalyptol, 64% liquid petroxolin.

Q.—What is the acetone for?
A.—To dissolve the iodoform.

Q.—What is the strength of **Menthol Petrox?**
A.—17%.

Q.—What is the strength of **Methyl Salicylate Petrox?**
A.—20%.

Q.—What is the strength of **Phenol Petrox?**
A.—5%.

Q.—What kind of phenol is used?
A.—The crystals.

Q.—What is there in **Camphorated Phenol Petrox?**
A.—Phenol 12.5%, Camphor 37.5%, Liquid Petroxolin 50%.

Q.—What is the strength of **Tar Petrox?**
A.—25%.

Q.—What form of Tar is used?
A.—Rectified Oil of Tar.

Q.—What is there in **Sulphurated Petrox?**
A.—Sulphur 3%, Linseed Oil 37%, Oleic Acid 30%.

Q.—Why is the Linseed Oil used?
A.—For the purpose of dissolving the sulphur.

Q.—What is there in **Compound Sulphurated Petrox?**
A.—Sulphurated Petrox 10%, Oil of Cade 10%, Thymol 0.3%, Eucalyptol 3%, Oil of Turpentine 30%.

Q.—What is the strength of **Venice Turpentine Petrox?**
A.—20%.

SYRUPI—SYRUPS

Q.—Define Syrups.
A.—Saturated solutions of sugar in water or solutions of medicinal substances in syrup.

Q.—How should syrups be stored?
A.—In a cool place where the temperature is uniform.

Q.—How should the bottle be treated which is to hold the syrup?
A.—It should be sterilized just before filling.

Q.—How do syrups generally spoil?
A.—They ferment.

Q.—Can anything be done to restore syrups after they have fermented?
A.—Some people will boil them to stop the fermentation but this should not be done. When a syrup has undergone fermentation, its composition is changed and it should be thrown away.

Q.—Are the loosely covered syrup bottles ideal for storing syrups?
A.—No, the bottles should be tightly stoppered and fairly small so that a large quantity of syrup will not be exposed to the air each time the container is opened.

Q.—Why should recently boiled distilled water be used in making syrups?
A.—To insure its freedom from mineral matter and from spores which might cause fermentation when in the presence of the sugar.

Q.—Name four methods of preparing the official Syrups.
A.—(1) dissolving sugar in the liquid, (2) mixing a solution with syrup or sugar, (3) solution and clarification, (4) extraction.

Q.—What is the Latin title for Syrup?
A.—**Syrupus.**

Q.—What is the synonym?
A.—Simple Syrup.

Q.—What is the formula for Syrupus?
A.—85 Gm. of sugar and sufficient water to make 100 mils of Syrup.

Q.—How much water should it take to dissolve 85 Gm. of sugar?
A.—Not to exceed 47.5 mils.

Q.—How much water should it take to dissolve 85 Gm. of sugar?
A.—100 mils would weigh 132.5 Gm.

Q.—What is the percentage strength of sugar by weight in the syrup?
A.—The syrup weighs 132.5 Gm. of which 85 Gm. is sugar, hence $85 \div 132.5 = 64 + \%$.

Q.—What two methods are official for making Syrupus?
A.—By cold percolation and by dissolving the sugar in boiling water.

Q.—Which is the preferable method?
A.—Cold percolation.

Q.—Why is it, when it seems that by the hot process the syrup is sterilized?
A.—It is true that it is sterilized, but the heat tends to convert some of the sugar into glucose which very quickly ferments.

Q.—Will the syrup be any better if more than the required weight of sugar is dissolved in the water?
A.—No, for just as soon as the solution cools to room temperature, the excess of sugar will crystallize out, and, it is said, this will induce more to crystallize out so that in the end the syrup will have less sugar than the formula calls for, then this unsaturated solution will quite quickly ferment.

Q.—What other U. S. P. syrup is made by dissolving the sugar in the cold simple liquid?
A.—**Syrupus Aurantii Florum.**

Q.—What use is made of this syrup?
A.—Simply as a vehicle or flavoring syrup.

Q.—What is the strength of **Syrupus Acaciæ?**
A.—10% acacia.

Q.—What is the method of preparation?
A.—Dissolve the acacia in water in a porcelain or enameled dish, stir in the sugar and when dissolved put the dish on a water-bath, bring the water in the bath to boiling and heat the solution for 15 minutes. Strain the syrup while hot and add water to make the required volume.

Q.—How is it to be stored?
A.—Small bottles are heated in an oven to a temperature of 160° C for 20 minutes, they are rinsed with boiling water and filled with the syrup which is still hot, and stoppered with rubber stoppers which have been boiled in water for 30 minutes. Over the stoppers place a cap of paper.

Q.—Does **Syrup of Acacia** spoil more quickly than Simple Syrup?
A.—Yes, because acacia in water is quickly fermented.

Q.—Why is so much heat used in the preparation of the Syrup of Acacia?
A.—In every case it is a measure of sterilization to destroy spores and enzymes which occur naturally in acacia and cause fermentation.

Q.—What is the reason for using sterilized rubber stoppers?

A.—The rubber stoppers fit more tightly than cork or glass and serve better to exclude bacteria.

Q.—What is the syrup used for?

A.—Particularly as a vehicle to suspend insoluble chemical substances, as bismuth salts.

Q.—What is there in **Syrupus Acidi Citrici?**

A.—Citric acid, tincture lemon peel each 1%, and syrup to make 100%.

Q.—What precaution is directed in dispensing this Syrup?

A.—It is not to be dispensed unless free from moulds and fermentation products.

Q.—What particular use is made of this syrup?

A.—Used as a flavoring syrup.

Q.—What is the strength of **Syrupus Acidi Hydriodici?**

A.—100 mils of the syrup contains not less than 1.3 Gm. nor more than 1.45 Gm. of Hydriodic Acid.

Q.—How is this Syrup made?

A.—By mixing 12.5% dilute hydriodic acid, with 30% distilled water and 57.5% of Syrup.

Q.—What objectionable decomposition product is sometimes found in this syrup?

A.—Free iodine.

Q.—What protects the syrup from a larger quantity of free iodine?

A.—When the dilute hydriodic acid is made, there is made at the same time some hypophosphorous acid which tends to prevent the liberation of the iodine from the hydriodic acid.

Q.—What test is used to show the freedom from iodine?

A.—When starch T. S. is added to the syrup, there should be no blue color.

Q.—Sometimes this syrup will show considerable dark color and still contain no free iodine. What is the cause?

A.—The free acid tends to caramelize the sugar in the syrup.

Q.—What is the syrup therapeutically?

A.—Alterative.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—By what process is **Syrupus Aurantii** made?
A.—Clarification and solution.

Q.—What is it made from?
A.—Tincture sweet orange peel 5%, citric acid 0.5%, sugar, water, and purified talc.

Q.—What is the Citric Acid for?
A.—To impart a pleasant acid taste.

Q.—What use is made of this syrup?
A.—As a flavoring syrup, particularly with iron preparations.

Q.—What is used in making **Syrupus Calcii Lactophosphatis?**
A.—Precipitated calcium phosphate, lactic acid, phosphoric acid, stronger orange flower water, sugar, glycerin, and water.

Q.—How is the calcium lactate prepared?
A.—By reaction between the precipitated calcium carbonate and lactic acid.

Q.—How is the Calcium Phosphate made?
A.—By now decomposing the calcium lactate with phosphoric acid, and the phosphate is then held in solution by the lactic acid.

Q.—Why is Calcium Phosphate not used in the first place instead of making it in this round-about manner?
A.—Calcium phosphate when once dried is not nearly so easily soluble as when freshly made and still moist.

Q.—What causes this syrup to darken on standing?
A.—Probably the action of the acid on the sugar tends to char it.

Q.—What is it therapeutically?
A.—Tonic, especially useful in rickets.

Q.—What is the dose?
A.—10 mils or 2½ fluidrachms.

Q.—What is the strength of **Syrupus Ferri Iodidi?**
A.—Must contain not less than 4.75% nor more than 5.25% of Ferrous Iodide.

Q.—What is it made from?
A.—Iron wire, iodine, dilute hypophosphorous acid, sugar and water.

Q.—How is the solution of ferrous iodide made?
A.—By direct reaction between the iron and iodine in the presence of water.

Q.—Why is it necessary to sometimes place the flask in cold water when the reaction is going on?
A.—So much heat is developed that it may volatilize some of the iodine, or crack the flask.

Q.—How does one tell when the reaction is finished?
A.—When the mixture has lost the odor of iodine and assumed a greenish color.

Q.—Is the green color a deep or marked green?
A.—No, it is rather a dirty green and not deep.

Q.—Why is the mixture finally heated to boiling?
A.—To hasten the completion of the reaction between the iron and iodine.

Q.—Why is an excess of iron taken in the first place?
A.—It hastens the reaction, prevents the liberation of iodine and the excess may be removed in the filtration.

Q.—Why is some of the sugar added to this solution before it is filtered?
A.—To prevent the oxidation of the iodine during the filtration of the solution into the sugar.

Q.—What is the use of the dilute hypophosphorous acid?
A.—It protects the iodine against oxidation and liberation.

Q.—How should the syrup be stored?
A.—In small bottles, filled to the cork, tightly stoppered, and exposed to the light.

Q.—Why is it best to have it in the light?
A.—Light is a reducing agent and tends to prevent the liberation of the iodine.

Q.—What is the object in having the bottles completely filled?
A.—This prevents contact with air which tends to oxidize the iodine, liberating it.

Q.—What may give a reddish color to the syrup besides the presence of free iodine?
A.—The free acid may char the sugar.

Q.—If the iodine is liberated what may be done to restore it?
A.—Add a little reduced iron to the syrup and place it in bright light.

Q.—What is the test for the presence of free iodine?
A.—Add a few drops of starch T. S. to the syrup and if free iodine is present a blue color is developed.

Q.—What is the syrup therapeutically?
A.—Alterative.

Q.—How ought it to be administered?
A.—Taken through a glass tube, as the acid iron mixture is likely to injure the teeth.

Q.—What is the dose?
A.—1 mil or 15 minims.

Q.—What is there in **Syrupus Hypophosphitum?**
A.—Calcium, potassium and sodium hypophosphites, dilute hypophosphorous acid, glycerin, sugar, and water.

Q.—When the hypophosphites are dissolved in water what is the reason that a cloudiness is sometimes seen in the mixture?
A.—Because the calcium hypophosphite has been oxidized to phosphate and is insoluble.

Q.—What is the reason for having dilute hypophosphorous acid in this syrup?
A.—It tends to convert any calcium phosphate to hypophosphite, thereby aiding solution. It also gives a more agreeable taste to the syrup.

Q.—What is the syrup therapeutically?
A.—Said to be nutritive.

Q.—Is it of value therapeutically?
A.—Said not to be, as it has been demonstrated that all the hypophosphite administered in the syrup may be recovered from the urine.

Q.—What is the dose of the syrup?
A.—10 mils or 2½ fluidrachms.

Q.—What form of Ipecac is used in preparing **Syrupus Ipecacuanhæ?**
A.—The Fluidextract.

Q.—What else is there used?
A.—Acetic acid, glycerin, sugar and water.

Q.—Why is acetic acid used?
A.—To keep the alkaloids of the ipecac in solution.

Q.—Why is glycerin used?
A.—To better protect the syrup against fermentation.

Q.—What other acid is there in this syrup?
A.—Hydrochloric acid, this acid is in the menstruum used in making the fluidextract and is there for the purpose of converting the alkaloids into soluble salts.

Q.—What is the syrup therapeutically?
A.—Expectorant and emetic.

Q.—What is the dose?
A.—Expectorant 1 mil or 15 minims, emetic 15 mils or 4 fluidrachms.

Q.—What form of Lactucarium is used in making the **Syrup of Lactucarium?**
A.—Tincture of Lactucarium.

Q.—What else is there in the syrup?
A.—Glycerin, citric acid, orange flower water and syrup.

Q.—What is the citric acid for?
A.—To give a pleasant flavor to the syrup.

Q.—What is the orange flower water for?
A.—To impart a pleasant flavor.

Q.—What is the glycerin for?
A.—To retard fermentation.

Q.—What is it therapeutically?
A.—Used largely as a cough sedative.

Q.—What is the dose?
A.—10 mils or 2½ fluidrachms.

Q.—How much Tar is there in **Syrupus Picis Liquidæ?**
A.—0.5%.

Q.—What kind of Tar is used?
A.—Pine tar.

Q.—What else is used in the preparation?
A.—Alcohol, magnesium carbonate, sugar, and water.

Q.—What is the alcohol for?
A.—To dissolve the tar.

Q.—What is the magnesium carbonate for?
A.—It acts as a clarifying agent. Also the alkalinity formed in contact with water has solvent action on tar, which would not be the case if talcum were used.

Q.—What is this syrup therapeutically?
A.—Stimulant and expectorant.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—Give the Latin title for **Syrup of Wild Cherry.**
A.—Syrupus Pruni Virginianæ.

Q.—What percentage of Bark is used in preparing the Syrup?
A.—15%.

Q.—What is the active constituent in the Syrup?
A.—Hydrocyanic acid.

Q.—Is this acid present as such in the Bark?
A.—No, it is developed by reaction between a glucoside and a ferment when the bark is moistened.

Q.—What other acid is present and may cause a change in color when mixed with metallic salts?
A.—Tannic acid.

Q.—What is the glycerin for?
A.—It is a solvent for astringent matter which is extracted and serves to hold it in solution. It is also an aid to the sugar in retarding fermentation.

Q.—Why does the drug macerate for 24 hours before the extraction?
A.—Said to be for the purpose of allowing the reaction for the formation of hydrocyanic acid, to become complete.

Q.—Is this really necessary?
A.—No, it has been shown by demonstration that the greatest percentage of hydrocyanic acid is obtained when the maceration continues for less than one hour.

Q.—Why is it macerated in a nonmetallic container?
A.—Because the hydrocyanic acid would react with the metal to form a metallic cyanide. Also the tannin in the bark would

react to form a tannate with the metal and this would discolor if not ruin the syrup.

Q.—Why is the sugar dissolved in the percolate without the aid of heat?

A.—Heat would drive off the hydrocyanic acid.

Q.—Why must the syrup be stored in tightly-stoppered non-metallic containers in a cool place?

A.—The hydrocyanic acid is volatile, hence the container must be tightly stoppered to prevent its escape, this is also the reason for storing in a cool place. It must be nonmetallic because the acid would attack the metal.

Q.—What is it therapeutically?

A.—Sedative; also used as a vehicle in cough mixtures.

Q.—May it be made from the fluidextract?

A.—Absolutely not, there is no possibility of getting any hydrocyanic acid in this method.

Q.—What is the dose of the syrup?

A.—4 mils or 1 fluidrachm.

Q.—What form of Rhubarb and how much is used in making **Syrupus Rhei?**

A.—10% of the fluidextract.

Q.—What else is used?

A.—Potassium carbonate, spirit of cinnamon, and syrup.

Q.—What is the spirit of cinnamon for?

A.—To give the syrup a more agreeable flavor.

Q.—What is the potassium carbonate for?

A.—The potassium carbonate is alkaline and dissolves the resinous constituents of the rhubarb which otherwise would precipitate when mixed with anything containing as much water as syrup.

Q.—What is the syrup therapeutically?

A.—Laxative.

Q.—What is the dose?

A.—10 mils or 2½ fluidrachms.

Q.—What is used to make **Syrupus Rhei Aromaticus?**

A.—Aromatic tincture of rhubarb, potassium carbonate, and syrup.

Q.—What is the synonym?
A.—Spiced syrup of rhubarb.

Q.—What is the syrup therapeutically?
A.—Said to be laxative and also astringent due to the aromatics present.

Q.—What is the dose?
A.—10 mils or 2½ fluidrachms.

Q.—What is there in **Syrupus Sarsaparillæ Compositus?**
A.—Fluidextract sarsaparilla 20%, fluidextracts of glycyrrhiza and senna, each 1.5%; oil of sassafras, oil of anise, methyl salicylate, alcohol, syrup.

Q.—What is it therapeutically?
A.—Alterative, but generally used as a vehicle.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—What form of Squill is used in making **Syrupus Scillæ?**
A.—Vinegar of Squill, 45%.

Q.—What is Vinegar of Squill?
A.—A preparation made by extracting squill with dilute acetic acid.

Q.—Does this syrup then contain free acid?
A.—Yes.

Q.—What precaution is to be taken when it is mixed with a carbonate or bicarbonate?
A.—The mixing should be done in an open container and not put into a corked bottle until the reaction is complete.

Q.—What is the synonym of **Syrupus Scillæ Compositus?**
A.—Hive syrup; also called Coxe's Hive Syrup.

Q.—What does it contain?
A.—Fluidextract squill and fluidextract senega, each 8%; antimony and potassium tartrate 0.2%, water, and syrup.

Q.—What precaution is taken to insure complete solution of the antimony and potassium tartrate?
A.—It is dissolved in hot water before mixing with the other ingredients.

Q.—What is the common name for antimony and potassium tartrate?
A.—Tartar emetic.

Q.—What is the therapeutic action of these syrups?
A.—Expectorant.

Q.—What is the dose in each case?
A.—2 mils or 30 minims.

Q.—What form of Senega is used in making **Syrupus Senegæ**?
A.—The fluidextract, 20%.

Q.—How does it come that this syrup is sometimes slightly alkaline?
A.—Because the fluidextract contains some ammonia water which neutralizes the pectin and prevents gelatinization.

Q.—What is the syrup therapeutically?
A.—Expectorant.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What form of Senna is used in making **Syrupus Sennæ**?
A.—Fluidextract, 25%.

Q.—What else is there in the syrup?
A.—Oil of Coriander, 0.5% syrup.

Q.—What is the Oil of Coriander for?
A.—This imparts a rather pleasant flavor to the syrup and is said to overcome the griping which sometimes attends the use of senna.

Q.—What is the Syrup therapeutically?
A.—A laxative.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What form of Tolu is used in making **Syrupus Tolutanus**?
A.—The tincture, 5%.

Q.—What else is there in the Syrup?
A.—Magnesium Carbonate, sugar and water.

Q.—What is the Magnesium Carbonate for?
A.—It acts as a clarifying agent, and its alkalinity has a solvent action on the tolu.

Q.—What is the syrup therapeutically?
A.—Said to be expectorant but generally used as a pleasantly flavored vehicle.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—What is the English name for **Syrupus Zingiberis?**
A.—Syrup of Ginger.

Q.—What form of Ginger is used in preparing the Syrup?
A.—The fluidextract, 3%.

Q.—What else is used?
A.—Alcohol, magnesium carbonate, sugar and water.

Q.—What is the alcohol for?
A.—To dissolve the ginger in the fluidextract.

Q.—What is the magnesium carbonate for?
A.—It acts as a clarifying agent and its alkalinity has a solvent action on the resin in the ginger.

Q.—What is it therapeutically?
A.—Carminative, stimulant and flavor.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—Which of the syrups contain free acid?
A.—Syrupus Acidi Citrici.
Ipecacuanhæ.
Lactucarii.
Scillæ.
Aurantii.
Acidi Hydriodici.
Calcii Lactophosphatis.
Ferri Iodidi.
Hypophosphitum.

Q.—What care is to be taken when mixing these with carbonates or bicarbonates?
A.—Mix them in an open container and do not cork the bottle until the reaction is complete.

Q.—When water is added through a strainer or filter to make a syrup up to a required quantity, what precaution must be observed?
A.—To thoroughly shake the bottle after adding the water otherwise there will be a zone of dilute syrup where the water and syrup meet and this will quickly ferment.

Q.—Name the syrup made by extraction.
A.—Syrup of Wild Cherry.

Q.—Name the syrup made by cold infusion.
A.—Syrup of Wild Cherry.

N. F. SYRUPS

Q.—How many Syrups in the N. F.?
A.—44.

Q.—Are there any different processes used in preparing them than are used in the U. S. P.?
A.—No.

Q.—What change is likely to take place in syrups which contain a large proportion of vegetable extractive?
A.—After standing a while they are likely to become turbid.

Q.—Why is this?
A.—The extractive is oxidized and is no longer soluble in the syrup.

Q.—What is to be done in such cases?
A.—They should be mixed with purified talc or purified siliceous earth and filtered through paper.

Q.—What quantity of syrup should be made at one time?
A.—Not more than is likely to be used in from four to six weeks.

Q.—Name the N. F. Syrups.
A.—Syrupus Allii.
Althææ.
Ammonii Hypophosphitis.
Asari Compositus.
Bromidorum.
Calcii et Sodii Hypophosphitum.
Calcii Hydrochlorphosphatis.
Calcii Hypophosphitis.

Calcii Iodidi.
Calcii Lactophosphatis et Ferri.
Cimicifugæ Compositus.
Cinnamomi.
Codeinæ.
Eriodictyi Aromaticus.
Ferri et Mangani Iodidi.
Ferri Hypophosphitis.
Ferri Lactophosphatis.
Ferri Protochloridi.
Ferri, Quinine et Strychnine Phosphatum.
Ferri Saccharati Solubilis.
Ficorum Compositus.
Glycyrrhizæ.
Hypophosphitum Compositus.
Iodotannicus.
Ipecacuanhæ et Opii.
Krameriæ.
Mannæ.
Morphinæ et Acaciæ.
Papaveris.
Phosphatum Compositus.
Phosphatum cum Quinina et Strychnina.
Pini Strobi Compositus.
Pini Strobi Compositus cum Morphina.
Quinidinæ.
Rhamni Catharticæ.
Rosæ.
Rubi.
Rubi Fructus.
Rubi Idæi.
Sanguinariæ.
Sennæ Aromaticus.
Sennæ Compositus.
Sodii Hypophosphitis.
Stillingiæ Compositus.

Q.—What is the English name for **Syrupus Allii?**
A.—Syrup of Garlic.

Q.—What is its strength?
A.—20% garlic.

Q.—How is it prepared?
A.—The garlic is extracted with diluted acetic acid by maceration and expression, and 80% of sugar dissolved in the liquid extract.

Q.—What is the syrup therapeutically, and the dose?
A.—Expectorant; dose 4 mils or 1 fluidrachm.

Q.—What precaution is to be observed in preparing Syrup of Garlic?
A.—Avoid the use of metallic containers or utensils.

Q.—What is the strength of **Syrupus Althææ?**
A.—5%.

Q.—Why does it contain alcohol and glycerin?
A.—These retard fermentation.

Q.—What is the syrup therapeutically, and the dose?
A.—Demulcent; dose 4 mils or 1 fluidrachm.

Q.—What is the strength of the **Syrupus Ammonii Hypophosphitis?**
A.—3.5% ammonium hypophosphite.

Q.—What else is in the syrup?
A.—Dilute hypophosphorus acid, glycerin, compound spirit of vanillin, syrup.

Q.—What is it therapeutically, and the dose?
A.—Tonic expectorant; dose 4 mils or 1 fluidrachm.

Q.—How much Asarum in **Syrupus Asari Compositus?**
A.—6.2%.

Q.—What are the synonyms for Asarum?
A.—Canada Snake Root; Wild Ginger.

Q.—What else is there in the syrup?
A.—Alcohol, cochineal, potassium carbonate, fluidextract of ipecac, sugar, and water.

Q.—What is the potassium carbonate for?
A.—It makes soluble compounds of the resins of the Asarum which would otherwise precipitate in the syrup, also acts dissolvingly on the coloring matter in the cochineal and produces a deeper color.

Q.—What is it therapeutically, and the dose?
A.—Expectorant; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Syrupus Bromidorum?**
A.—Potassium bromide, sodium bromide, each 8%; ammonium bromide 5%; calcium bromide 2.5%, lithium bromide 0.8%, flavored with tincture of vanilla, colored with compound tincture of cudbear. Contains also 45% of compound syrup of sarsaparilla, then syrup.

Q.—What is it therapeutically, and the dose?
A.—Nerve sedative; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Syrupus Calcii et Sodii Hypophosphitum?**
A.—3.5% each of sodium and calcium hypophosphites, 0.15% of hypophosphorous acid, sugar, and water.

Q.—Why is the hypophosphorous acid present?
A.—It aids in the solution of the calcium hypophosphite and gives the syrup a more pleasant acidulous taste.

Q.—What is it therapeutically, and the dose?
A.—Said to be a nutritive tonic; dose 4 mils or 1 f3.

Q.—What is used in making **Syrupus Calcii Hydrochlorophosphatis?**
A.—Precipitated calcium phosphate, tincture of lemon peel, hydrochloric acid, water, and syrup.

Q.—How is it put together?
A.—The calcium phosphate is triturated with a little water, then with sufficient hydrochloric acid to dissolve it, avoiding an excess. Then the tincture is added, filtered and made up with syrup.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the strength of **Syrupus Calcii Hypophosphitis?**
A.—3.5% of calcium hypophosphite.

Q.—What else is there in it?
A.—Hypophosphorous acid, sugar, and water.

Q.—Why is it necessary to have the hypophosphorous acid?
A.—The calcium hypophosphite is likely to be slightly oxidized and contain some phosphate, in which case it is not soluble, hence the hypophosphorous acid is used to dissolve it and reconvert it.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is used in making **Syrupus Calcii Iodidi?**
A.—Iodine, iron wire, precipitated calcium carbonate, sugar, water, and syrup.

Q.—What is the first salt formed in making this syrup?
A.—Ferrous iodide.

Q.—Why is more iodine then added?
A.—To convert the ferrous to ferric iodide.

Q.—Why are these reactions necessary?
A.—Because the calcium salt can not be made to combine readily with iodine.

Q.—Why is the iodide wanted as Ferric Iodide and not Ferrous Iodide?
A.—When the salt Calcium Iodide is formed and in solution, the iron must be removed and it is best removed if it is in the Ferric condition as it is rather less soluble.

Q.—Why must the heat be carefully regulated?
A.—If there is too much heat, iodine may volatilize.

Q.—What is this syrup therapeutically?
A.—Alterative, especially in asthma.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is used in making **Syrupus Calcii Lactophosphatis et Ferri?**
A.—Ferrous Lactate, Potassium Citrate, water, and Syrup of Calcium Lactophosphate.

Q.—Why is potassium citrate used here?
A.—The ferrous lactate is not easily soluble and this alkaline citrate aids in its solution and in retaining it in solution when mixed with the syrup.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the synonym for **Syrupus Cimicifugæ Compositus?**
A.—Compound Syrup of Actæa.

Q.—What is used in making it?

A.—The fluidextracts of cimicifuga, glycyrrhiza, senega and ipecac; wild cherry, talc, sugar and water.

Q.—How is it prepared?

A.—The wild cherry is macerated with water for a hour, then to it are added the fluidextracts and talc, this mixture is thoroughly stirred for 15 minutes. It is transferred to a wetted filter and when the liquid has ceased to drop, the filter is washed with sufficient water to obtain 50% of filtrate. The sugar is then dissolved in the filtrate without heat.

Q.—What is it therapeutically, and the dose?

A.—Expectorant; dose 4 mils or 1 fluidrachm.

Q.—How is **Syrupus Cinnamomi** prepared?

A.—Saigon cinnamon is moistened and macerated with alcohol and cinnamon water, then percolated until 48% of percolate is collected, in this is dissolved the sugar.

Q.—What is the syrup therapeutically, and the dose?

A.—Astringent and carminative; dose 4 mils or 1 fluidrachm.

Q.—What is used in making **Syrupus Codeinæ?**

A.—Codeine sulphate and syrup.

Q.—How much codeine sulphate is used?

A.—0.2%.

Q.—Can this be sold without a prescription and not violate the provisions of the Harrison act?

A.—Yes, as it does not contain in excess of one grain of codeine to the fluid ounce.

Q.—What is it therapeutically, and the dose?

A.—Sedative; dose 4 mils or 1 fluidrachm.

Q.—Give the synonyms for **Syrupus Eriodictyi Aromaticus.**

A.—Aromatic Syrup of Yerba Santa; Syrupus Corrigens.

Q.—What is used to make it?

A.—Fluidextract of eriodictyon, solution of potassium hydroxide, compound tincture of cardamom, oils of lemon, sassafras and clove, alcohol, sugar, magnesium carbonate, and water.

Q.—What is the function of the solution of potassium hydroxide?

A.—It forms compounds with the resinous matter in the fluidextract of yerba santa which will dissolve in the syrup. Otherwise it would precipitate.

Q.—What is the magnesium carbonate for?
A.—Primarily it acts as a clarifying agent; its alkalinity also has some solvent action on the resins in the fluidextract.

Q.—What is the compound tincture of cardamom for?
A.—To give color and flavor to the syrup.

Q.—What use is made of the syrup?
A.—Used largely to mask the tast of bitter drugs, as quinine and its salts.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What is used in making **Syrupus Ferri et Mangani Iodidi?**
A.—Iodine, iron wire, manganese sulphate, sodium iodide, sugar, diluted alcohol, and water.

Q.—Is the iron iodide, ferrous or ferric iodide?
A.—Ferrous iodide.

Q.—How is it formed?
A.—Direct reaction between iodine and iron wire.

Q.—Why is the solution of ferrous iodide filtered into the sugar before the manganese iodide is made?
A.—To prevent the liberation of the iodine from the ferrous iodide by the oxygen of the air, while making the manganese iodide.

Q.—How is the manganese iodide made?
A.—Reaction between sodium iodide and manganese sulphate.

Q.—Why is the diluted alcohol used?
A.—The resulting sodium sulphate is not soluble in alcohol, hence may be filtered out.

Q.—What is it therapeutically?
A.—Chalybeate tonic.

Q.—What is the dose?
A.—1 mil or 15 minims.

Q.—Is **Syrupus Ferri Hypophosphitis** a ferrous or a ferric preparation?
A.—Ferric.

Q.—What is used in making the Syrup?
A.—Ferric hypophosphite, potassium citrate, sugar, orange flower water and water.

Q.—Why is potassium citrate used?

A.—The ferric hypophosphite is rather difficult to get into solution but an alkaline citrate makes it go into solution quite readily and holds it in solution.

Q.—What is the Syrup therapeutically?

A.—Tonic.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What salt of iron is used in making **Syrupus Ferri Lactophosphatis?**

A.—Ferrous lactate.

Q.—What is used to develop the lactophosphate?

A.—Phosphoric acid is added to the ferrous lactate.

Q.—What is it therapeutically?

A.—Chalybeate tonic.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What is used in making **Syrupus Ferri Protochloridi?**

A.—Solution of ferrous chloride, glycerin, orange flower water and syrup.

Q.—What is the English name for the Syrup?

A.—Syrup of Ferrous Chloride.

Q.—What is it therapeutically?

A.—Tonic.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What is used in making **Syrupus Ferri, Quininæ et Strychninæ Phosphatum?**

A.—Ferric phosphate, quinine, strychnine, phosphoric acid, glycerin, water and syrup.

Q.—What percentage of strychnine is in the Syrup?

A.—0.02%, $\frac{2}{100}$%.

Q.—How much strychnine would this make in a teaspoonful of the Syrup?

A.—Approximately $\frac{1}{80}$ gr.

Q.—Why are the strychnine and quinine first mixed with phosphoric acid instead of water?

A.—The alkaloid is not soluble in water, but on mixing with phosphoric acid they are converted into the phosphates of quinine and strychnine which are water soluble.

Q.—What is the Syrup therapeutically?

A.—Nerve tonic and haemitinic.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What is the common name for the Syrup?

A.—Easton's syrup.

Q.—What is the English name for **Syrupus Saccharati Solubilis?**

A.—Syrup of Saccharated Iron.

Q.—What form of iron is used to make it?

A.—Saccharated Ferric Oxide.

Q.—What is it therapeutically?

A.—Chalybeate tonic.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What is the English name for **Syrupus Ficorum Compositus?**

A.—Compound Syrup of Figs.

Q.—What is used in making it?

A.—Figs, fluidextract of senna, aromatic fluidglycerate of cascara sagrada, oil of fennel, spirit of peppermint, sugar and water.

Q.—What proprietary is said to be like this?

A.—Syrup of figs.

Q.—What is it therapeutically and the dose?

A.—Laxative, dose 4 mils or 1 fluidrachm.

Q.—What is used in making **Syrupus Glycyrrhizæ?**

A.—Fluidglycerate of Glycyrrhiza 25% and syrup.

Q.—What particular use is made of this Syrup?

A.—Used to mask the bitter taste of quinine preparations.

Q.—What is the dose?

A.—8 mils or 2 fluidrachms.

Q.—What is used in making **Syrupus Hypophosphitum Compositus?**

A.—Calcium, potassium, sodium, ferric and manganese hypophosphites, quinine, strychnine, sodium citrate, diluted hypophosphorous acid, sugar, glycerin, and water.

Q.—What is the sodium citrate for?

A.—It is mixed with the ferric and manganese hypophosphites to make them go into solution.

Q.—What is the diluted hypophosphorous acid for?

A.—This converts the alkaloids quinine and strychnine into hypophosphites and makes them soluble. It also aids in the solution of the calcium hypophosphite and gives to the syrup a rather agreeable acidulous flavor.

Q.—What is it therapeutically?

A.—Tonic.

Q.—How much is a dose?

A.—8 mils or 2 fluidrachms.

Q.—How much strychnine would there be in the dose?

A.—About 1/75 gr.

Q.—What is used in making **Syrupus Iodotannicus?**

A.—Iodine, tannic acid, sugar and water.

Q.—How is it made?

A.—The iodine and tannic acid are mixed in a flask and heated on a water-bath at a temperature not exceeding 50° C. until a drop of the liquid ceases to give a blue color with starch T. S. It is then mixed with sugar and water and made to required quantity.

Q.—What is the active constituent of the Syrup?

A.—Largely impure hydriodic acid.

Q.—What is it therapeutically?

A.—Alterative and astringent.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What is the synonym for **Syrupus Ipecacuanhæ et Opii?**

A.—Syrup of Dover's Powder.

Q.—What is used in making it?
A.—Tincture of ipecac and opium 8.5%, spirit of cinnamon, cinnamon water, and syrup.

Q.—What is the Syrup therapeutically?
A.—Diaphoretic and sedative.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What form of Krameria is used in making **Syrupus Krameriæ?**
A.—The fluidextract, 45%.

Q.—What is the syrup therapeutically?
A.—Intestinal astringent.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—How much Manna is there in **Syrupus Mannæ?**
A.—12.5%.

Q.—How is the Manna extracted?
A.—Dissolved in hot water, then alcohol is added and allowed to stand for 12 hours.

Q.—What is the Syrup therapeutically, and the dose?
A.—Laxative, dose 8 mils or 2 fluidrachms.

Q.—What is the synonym for **Syrupus Morphinæ et Acaciæ?**
A.—Jackson's Pectoral Syrup.

Q.—What is in it?
A.—Morphine hydrochloride 0.055%, oil of sassafras, and syrup of acacia.

Q.—What is the Syrup therapeutically?
A.—Expectorant and sedative.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—How much morphine hydrochloride in such a dose?
A.—0.0022 Gm. or 1/30 gr.

Q.—What is the English name for **Syrupus Papaveris?**
A.—Syrup of Poppy.

Q.—What is used in making it?
A.—Poppy capsules deprived of their seeds, sugar and water.

Q.—How is it made?

A.—The poppy capsules in the form of powder are exhausted by percolation with boiling water. The percolate is heated to boiling, then concentrated on a water-bath to 45%. Then the sugar is dissolved in the percolate and made up to required volume.

Q.—How must the syrup be stored?

A.—In small, completely filled bottles in a cool place.

Q.—Why must it be so stored?

A.—Because it is likely to mould.

Q.—What is the Syrup therapeutically?

A.—Sedative.

Q.—What is the dose?

A.—4 mils or 1 fluidrachm.

Q.—What is the synonym for **Syrupus Phosphatum Compositus?**

A.—Chemical food.

Q.—What is used in making it?

A.—Compound solution of phosphates, syrup, glycerin, and tincture of cudbear.

Q.—What is the dose of the syrup?

A.—4 mils or 1 fluidrachm.

Q.—What is used in **Syrupus Phosphatum cum Quinina et Strychnina?**

A.—Quinine hydrochloride 0.44%, strychnine nitrate 0.014%, compound solution of phosphates 50%, glycerin 15%, syrup.

Q.—What is the English name for **Syrupus Pini Strobi Compositus?**

A.—Compound Syrup of White Pine.

Q.—What is in it?

A.—White pine bark, wild cherry, aralia, balsam poplar buds, sanguinaria, sassafras, cudbear, chloroform, sugar, oil sassafras, alcohol, and water.

Q.—How is it prepared?

A.—The vegetable drugs are mixed and macerated then extracted with a menstruum of water, alcohol, and glycerin. The sugar, oil of sassafras, and chloroform are mixed with the percolate.

Q.—What is the Syrup therapeutically?
A.—Expectorant.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What other form of this Syrup is official?
A.—**Syrupus Pini Strobi Compositus cum Morphia.**

Q.—What salt of morphine and how much does it contain?
A.—Morphine sulphate, 0.04%.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is the synonym for **Syrupus Quinidinæ?**
A.—Bitterless Syrup of Quinidine.

Q.—What does it contain?
A.—Quinidine 3.3%, oil of orange and syrup.

Q.—What is quinidine?
A.—An alkaloid obtained from cinchona.

Q.—What is the Syrup therapeutically?
A.—Tonic, antiperiodic.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—Give the synonyms for **Syrupus Rhamni Catharticæ.**
A.—Syrup of Buckthorn Berries, Syr. Spinæ Cervinæ.

Q.—What does it contain?
A.—Fluidextract Rhamnus Cathartica 20%, oil of fennel, and oil of cinnamon, syrup.

Q.—What is the Syrup therapeutically?
A.—Cathartic; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Syrupus Rosæ?**
A.—Fluidextract of Rose 12.5%, diluted sulphuric acid 1%, sugar and water.

Q.—What is the dilute sulphuric acid for?
A.—It increases astringency, gives a redder color to the syrup and somewhat improves the taste.

Q.—What is it used for?
A.—A flavoring vehicle.

Q.—What is the common name for **Syrupus Rubi?**
A.—Syrup of Blackberry.

Q.—What is it made from?
A.—Fluidextract of Rubus, 25%.

Q.—What part of the plant is official as Rubus?
A.—The bark of the rhizome.

Q.—What particular therapeutic property does it have?
A.—Astringent.

Q.—What is the dose of the Syrup?
A.—4 mils or 1 fluidrachm.

Q.—What is **Syrupus Rubi Fructus** made from?
A.—Fresh ripe blackberries and sugar.

Q.—How is it prepared?
A.—The cleaned berries are strongly expressed and two parts of sugar mixed with one part of the juice. The mixture is heated until the sugar is dissolved and just brought to the boiling point, then strained and put in sterile bottles, well-filled and stoppered with corks which have been soaked in boiling water. Seal the bottles with melted paraffin. Store in a dark cool place.

Q.—What is this Syrup therapeutically?
A.—Slightly astringent but used principally as a flavoring vehicle.

Q.—What is the English name for **Syrupus Rubi Idæi?**
A.—Syrup of Raspberry.

Q.—How is it prepared?
A.—Crush the well-cleaned fresh, ripe berries and let them stand until a small portion of the filtered juice produces a clear solution with half its volume of alcohol. Then strain with pressure, heat juice to boiling, remove the scum and filter while hot. For every part of filtered juice add 2 parts of sugar. Agitate until the sugar is dissolved. Store in well-stoppered bottles in a dark, cool place.

Q.—What is the synonym for **Syrupus Sanguinariæ?**
A.—Syrup of Bloodroot.

Q.—How much Sanguinaria does it contain?
A.—22.5%.

Q.—How is it prepared?

A.—The Sanguinaria is macerated with 25% acetic acid for two hours. It is then percolated until the percolate measures 75% of the finished product. This is evaporated on the water-bath to 48% and in this the sugar is dissolved.

Q.—Why is acetic acid used?

A.—This converts the alkaloids of the sanguinaria to soluble salts so they are more readily held in solution in the syrup.

Q.—What is it therapeutically, and the dose?

A.—Expectorant; dose 2 mils or 30 minims.

Q.—What is used in making **Syrupus Sennæ Aromaticus?**

A.—Fluidextract of senna, jalap, rhubarb, Saigon cinnamon. clove, myristica, oil of lemon, sugar, diluted alcohol.

Q.—How is it prepared?

A.—The drugs are extracted with diluted alcohol, the percolate is mixed with the fluidextract of senna and the sugar dissolved in this.

Q.—What is this Syrup therapeutically?

A.—Purgative.

Q.—What is the dose?

A.—8 mils or 2 fluidrachms.

Q.—What is there in **Syrupus Sennæ Compositus?**

A.—Fluidextracts of senna, rhubarb and frangula; methyl salicylate, alcohol and syrup.

Q.—What is this Syrup therapeutically, and the dose?

A.—Purgative, dose 8 mils or 2 fluidrachms.

Q.—What is the strength of **Syrupus Sodii Hypophosphitis?**

A.—3.5% sodium hypophosphite.

Q.—What is it therapeutically, and the dose?

A.—Alterative, dose 4 mils or 1 fluidrachm.

Q.—What is there in **Syrupus Stillingiæ Compositus?**

A.—Compound fluidextract of Stillingia 25%, glycerin 10%.

Q.—What does the Compound Fluidextract contain?

A.—Stillingia, corydalis, blue flag, sambucus, chimaphila, coriander and prickly ash berries.

Q.—What is the Syrup therapeutically, and the dose?

A.—Alterative; dose 4 mils or 1 fluidrachm.

MELLITA—HONEYS

Q.—What is the Latin title for Honey?
A.—**Mel.**

Q.—What other form of Honey is official?
A.—**Mel Depuratum.**

Q.—What is the English name for Mel Depuratum?
A.—Clarified Honey.

Q.—How is it clarified?
A.—A convenient weight of honey is mixed in a tared dish with 2% of paper pulp and heated on the water-bath. As long as a scum forms it is removed. Strain and make up the loss in weight by the addition of distilled water, then add 5% glycerin.

Q.—Why is the glycerin added?
A.—It keeps the honey from granulating and separating into two layers.

Q.—Name the U. S. P. preparation of honey.
A.—**Mel Rosæ; Honey of Rose.**

Q.—How is it prepared?
A.—12 mils of Fluidextract of Rose is mixed with sufficient clarified honey to make 100 Gm.

Q.—What is the Honey of Rose used for?
A.—Principally as an excipient.

Q.—What U. S. P. preparation contains about 1/3 of Honey of Rose?
A.—Mass of Mercury.

Q.—Name the Honey preparations of the N. F.
A.—Mel Rosæ et Sodii Boratis, Mel Sodii Boratis and Oxymel Scillæ.

Q.—How much Borax in **Mel Rosæ et Sodii Boratis?**
A.—10%.

Q.—What is it therapeutically?
A.—An alkaline demulcent.

Q.—What is it used for?
A.—In treating acid sore mouth in children.

Q.—Has the Honey of Rose and Borax any advantage over Honey and Borax?

A.—It is perhaps slightly astringent.

Q.—How is **Oxymel of Squill** prepared?

A.—50 parts of Vinegar of Squill are mixed with 100 parts of Clarified Honey in a tared dish, and then evaporated on a water-bath until it weighs 100 Gm.

Q.—What is it therapeutically, and the dose?

A.—Expectorant and diuretic; dose 4 mils or 1 fluidrachm.

ELIXIRIA—ELIXIRS

Q.—Define Elixirs.

A.—Sweet, aromatic, hydro-alcoholic liquids which may or may not contain medicinal agents.

Q.—How many are in the U. S. P.?

A.—Only two.

Q.—Are they considered elegant preparations?

A.—Yes.

Q.—Why then is the number in the U. S. P. so limited?

A.—Because of the considerable quantity of alcohol which they usually contain, it was feared that they might come to be used more as tipples than as true therapeutic agents.

Q.—In what form are the aromatics generally used in preparing elixirs?

A.—As volatile oils.

Q.—What care must be exercised in the selection of the volatile oils?

A.—They must be fresh and of the finest quality.

Q.—Why is this particularly pointed out?

A.—Because volatile oils deteriorate with age and unless the best form of oil is used an inferior elixir will result.

Q.—Are any of the Elixirs expected to be turbid mixtures?

A.—No.

Q.—What should be done with them if they develop turbidity?

A.—They should be filtered through paper or otherwise clarified.

Q.—How should they be stored?
A.—In tightly stoppered bottles at ordinary room temperature.

Q.—What percentage of alcohol do they generally contain?
A.—About 25%.

Q.—Do any contain less than 25% of alcohol?
A.—Yes, special effort was made to devise formulas for some of the pleasant flavoring elixir vehicles which would be preserved with less than 10% of alcohol.

Q.—Name the two elixirs of the U. S. P.
A.—Elixir Aromaticum and Elixir Glycyrrhizæ.

Q.—What does **Aromatic Elixir** contain?
A.—1.2% compound spirit of orange, 23.8% alcohol, 37.5% each syrup and water.

Q.—Doesn't this as it stands now form a cloudy mixture?
A.—Yes, but the formula provides for 3% of purified talc which clarifies it.

Q.—What use is made of this elixir?
A.—Used as a flavoring vehicle and to prepare many other medicated elixirs.

Q.—What may be used to a better advantage than talc for clarifying simple elixir?
A.—Purified Kieselguhr, Terra Silicea Purificata.

Q.—Will it do to use this for clarifying all elixirs?
A.—No, it is likely to remove alkaloids and active principles which are in solution.

Q.—What is the synonym for **Elixir Glycyrrhizæ?**
A.—Elixir Adjuvans, Elixir of Licorice.

Q.—What does it contain?
A.—Fluidextract of Glycyrrhiza, 12.5%; and Aromatic Elixir, 87.5%.

Q.—Of what particular use is this Elixir?
A.—It masks the bitter taste of quinine and its salts quite effectively.

Q.—What is a common incompatibility of this elixir?
A.—Acids or mixtures of acid reaction.

Q.—Why is this an incompatibility?
A.—Acid renders insoluble and precipitates the sweet principle of licorice which is called glycyrrhizin.

N. F. ELIXIRS

Q.—How many Elixirs are official in the N. F.?

A.—76.

Q.—Which of these are the low alcoholic-content elixirs?

A.—Elixir Amygdalæ Compositum; Elixir Cardamomi Compositum; Elixir Glycyrrhizæ Aquosum; Elixir Vanillini Compositum.

Q.—Name the N. F. Elixirs.

A.—Elixir Ammonii Bromidi.
Ammonii Valeratis.
Amygdalæ Compositum.
Anisi.
Aromaticum Rubrum.
Aurantii Amari.
Bismuthi.
Buchu.
Buchu Compositum.
Buchu et Potassii Acetatis.
Calcii Bromidi.
Calcii et Sodii Glycerophosphatum.
Calcii Hypophosphitis.
Calcii Lactophosphatis.
Cardamomi Compositum.
Cascaræ Sagradæ.
Cascaræ Sagradæ Compositum.
Catharticum Compositum.
Cinchonæ Alkaloidorum.
Cinchonæ Alkaloidorum et Ferri.
Cinchonæ Alkaloidorum et Hypophosphitum.
Cinchonæ Alkaloidorum, Ferri, Bismuthi et Strychninæ
Cinchonæ Alkaloidorum, Ferri et Bismuthi.
Cinchonæ Alkaloidorum, Ferri et Calcii Lactophosphat
Cinchonæ Alkaloidorum, Ferri et Pepsini.
Cinchonæ Alkaloidorum, Ferri et Strychninæ.
Corydalis Compositum.
Eriodictyi Aromaticum.
Ferri Hypophosphitis.
Ferri Lactatis.
Ferri Phosphatis.
Ferri Pyrophosphatis.

Ferri Pyrophosphatis, Quininæ et Strychninæ.
Ferri, Quininæ et Strychninæ.
Formatum.
Formatum Compositum.
Gentianæ.
Gentianæ et Ferri.
Gentianæ et Ferri Phosphatis.
Gentianæ Glycerinatum.
Glycerophosphatum Compositum.
Glycyrrhizæ Aquosum.
Glycyrrhizæ Aromaticum.
Guaranæ.
Humuli.
Hypophosphitum.
Hypophosphitum et Ferri.
Lithii Bromidi.
Lithii Citratis.
Lithii Salicylatis.
Pepsini.
Pepsini, Bismuthi et Strychninæ.
Pepsini et Bismuthi.
Pepsini et Ferri.
Pepsini et Rennini Compositum.
Phosphori.
Phosphori et Nucis Vomicæ.
Potassii Acetatis.
Potassii Acetatis et Juniperi.
Potassii Bromidi.
Quininæ Valeratis et Strychninæ.
Rubi Compositum.
Sodii Bromidi.
Sodii Hypophosphitis.
Sodii Salicylatis.
Sodii Salicylatis Compositum.
Strychninæ Valeratis.
Taraxaci Compositum.
Terpini Hydratis.
Terpini Hydratis et Codeinæ.
Terpini Hydratis et Diacetylmorphinæ.
Trium Bromidorum.
Vanillini Compositum.

Viburni Opuli Compositum.
Viburni Prunifolii.
Zinci Valeratis.

Q.—What is the strength of **Elx. Ammonium Bromide?**
A.—8.5% Ammonium Bromide.

Q.—What is it therapeutically, and the dose?
A.—Sedative; dose 4 mils or 1 fluidrachm.

Q.—What is the strength of **Elx. Ammonium Valerate?**
A.—3.5% Ammonium Valerate.

Q.—What else does it contain?
A.—A little Chloroform, Tincture of Vanilla, and Compound Tincture of Cudbear, Ammonia Water, Elixir.

Q.—Why is Ammonia Water used in preparing this Elixir?
A.—There is usually a little free valeric acid in the ammonium valerate, this should be neutralized, for which purpose the ammonia water is used.

Q.—What is it therapeutically, and the dose?
A.—Antihysteric; dose 4 mils or 1 fluidrachm.

Q.—How much alcohol is there in **Elixir Amygdalæ Compositum?**
A.—About 5%.

Q.—What is it flavored with?
A.—Oil of Bitter Almond, Vanillin, and 15% of Stronger Orange Flower Water.

Q.—What is it used for?
A.—As a flavoring vehicle for masking the taste of disagreeable medicaments.

Q.—Is **Elixir of Anise** made from Anise?
A.—No, it contains Anethol, Oil of Fennel and Spirit of Bitter Almond.

Q.—What is Anethol?
A.—The principle constituent of Oil of Anise.

Q.—How much Alcohol does this Elixir contain?
A.—About 25%.

Q.—What is the Elixir used for?
A.—It is used as a flavor and also as a carminative.

Q.—What is the dose?

A.—For infants 1 mil or 15 minims.

Q.—Why must this Elixir be cooled to 15 C. before being filtered?

A.—This is perhaps a little below average room temperature and if it were not filtered at a temperature a little below that at which it was stored, the oils would be thrown out of solution and form a cloudy mixture.

Q.—What is **Elixir Aromaticum Rubrum?**

A.—Just the Aromatic Elixir of the U. S. P. colored with 0.2% of Cudbear.

Q.—What is the Elixir used for?

A.—As a vehicle.

Q.—What N. F. III elixir does **Elixir Aurantii Amari** replace?

A.—Elixir Curassao.

Q.—How much alcohol does it contain?

A.—About 30%.

Q.—What is it used for?

A.—Just as a flavoring vehicle.

Q.—What preparation of Bismuth is used in **Elixir Bismuthi?**

A.—Glycerite of Bismuth.

Q.—How much of the Glycerite is used?

A.—12.5%.

Q.—What is it therapeutically, and the dose?

A.—Slightly astringent; dose 4 mils or 1 fluidrachm.

Q.—What form of Buchu is used in **Elixir Buchu?**

A.—12.5% of the Fluidextract.

Q.—What is it therapeutically, and the dose?

A.—Diuretic and antiseptic; dose 4 mils or 1 fluidrachm.

Q.—From what is the **Compound Elixir of Buchu** made?

A.—25% of Compound Fluidextract of Buchu.

Q.—What is there in the Compound Fluidextract?

A.—Buchu 62.5%, Cubeb, Juniper Berries and Uva Ursi, each 12.5%.

Q.—What is the Elixir therapeutically, and the dose?

A.—Diuretic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Buchu and Potassium Acetate?**
A.—Potassium Acetate 8.5% and Elixir Buchu to make 100%.

Q.—What is it therapeutically, and the dose?
A.—Diuretic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Calcium Bromide?**
A.—8.5% Calcium Bromide; 0.4% Dilute Hydrobromic Acid; 20% Syrup; 46% Distilled Water; Aromatic Elixir to 100%.

Q.—What is it therapeutically, and the dose?
A.—Sedative; dose 4 mils or 1 fluidrachm.

Q.—Has this any advantage of **Elixir Potassium Bromide?**
A.—It is said that the Calcium makes the sedative action more pronounced.

Q.—What is there in **Elixir of Calcium and Sodium Glycerophosphates?**
A.—2.5% of Solution of Sodium Glycerophosphate; 0.875% of Calcium Glycerophosphate; 0.8% Phosphoric Acid, Glycerin 30%; Aromatic Elixir 30%.

Q.—What is it therapeutically, and the dose?
A.—Tonic in wasting and nervous diseases; dose 4 mils.

Q.—What is there in **Elixir of Calcium Hypophosphite?**
A.—3.5% Calcium Hypophosphite; 0.4% Hypophosphorous Acid.

Q.—Why is the Acid present?
A.—Aids in dissolving the salt which might contain a little phosphate.

Q.—What is it therapeutically, and the dose?
A.—Tonic; dose 8 mils or 2 fluidrachms.

Q.—What is used in making **Elixir of Calcium Lactophosphate?**
A.—Precipitated Calcium Carbonate, Lactic and Phosphoric Acids, flavored with Compound Spirit of Orange and Syrup, and contains 20% Alcohol.

Q.—How is it prepared?
A.—The precipitated calcium carbonate is dissolved in diluted lactic acid, then diluted phosphoric acid, after which add the flavors and vehicles.

Q.—Why are not Calcium Lactate and Calcium Phosphate used directly instead of making them at the time of preparing the Elixir?

A.—Because the freshly made and moist salts are so much more readily soluble than those which have been dried.

Q.—Is the Lactophosphate here a definite salt?

A.—Probably not; the Elixir no doubt contains Calcium Acid Phosphate, Calcium Acid Lactate and free Acid, Calcium Lactate.

Q.—What is it therapeutically, and the dose?

A.—Tonic; alterative, dose 8 mils or 2 fluidrachms.

Q.—What is there in **Compound Elixir of Cardamom?**

A.—1% Compound Spirit of Cardamom, 9% Alcohol, 40% Syrup, and Distilled Water.

Q.—What use is made of the Elixir?

A.—Popular as a low alcoholic-content flavoring vehicle.

Q.—What does **Elixir of Cascara Sagrada** contain?

A.—50% each of Aromatic Fluidextract of Cascara Sagrada and Aromatic Elixir.

Q.—What is the synonym?

A.—Elixir Rhamni Purshianæ.

Q.—What is it therapeutically, and the dose?

A.—Laxative; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Compound Elixir of Cascara Sagrada?**

A.—Aromatic Fluidextract of Cascara Sagrada, Fluidextracts of Senna and Juglands, Aromatic Elixir.

Q.—What is it therapeutically, and the dose?

A.—Cathartic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Compound Cathartic Elixir?**

A.—Fluidextract of Frangula 12.5%, of Senna 10%, of Rhubarb 6.2%, Spirit of Peppermint 1.4%, Solution of Potassium Hydroxide 0.45%, Aromatic Elixir.

Q.—What is the Spirit of Peppermint for?

A.—Flavor and in a measure to correct the griping action of the Fluidextracts.

Q.—What is the Solution of Potassium Hydroxide for?

A.—It saponifies the resins in the drugs thus making them mix clear with the Aromatic Elixir.

Q.—What is the Elixir therapeutically?
A.—Aperient and cathartic.

Q.—What is the dose?
A.—Aperient 4 mils, Cathartic 12 mils or 3 fluidrachms.

Q.—What are the synonyms for **Elixir Cinchonæ Alkaloidorum?**
A.—Elixir Cinchona; Elixir Calisaya Alkaloidal.

Q.—What does it contain?
A.—Quinine Sulphate 0.2%, Cinchonidine Sulphate 0.1%, Cinchonine Sulphate 0.1%, Compound Tincture of Cudbear and Aromatic Elixir.

Q.—What is the Compound Tincture of Cudbear for?
A.—To give a uniform color to the preparation.

Q.—What is the Elixir therapeutically?
A.—Tonic, antiperiodic, antimalarial.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What is the particular difference between this Elixir and the Elixir of Cinchona of N. F. III?
A.—This one contains no tannin.

Q.—What form of Iron is used in **Elixir Cinchonæ et Ferri?**
A.—Ferric Phosphate, 3.5%.

Q.—What is it therapeutically and the dose?
A.—Tonic, dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir of Cinchona Alkaloids and Hypophosphites?**
A.—Calcium and Sodium Hypophosphites, each 1.75%, Hypophosphorous Acid 0.8%, and Elixir of Cinchona Alkaloids to make 100%.

Q.—What is it therapeutically, and the dose?
A.—Tonic; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir of Cinchona Alkaloids, Iron, Bismuth and Strychnine?**
A.—Strychnine Sulphate 0.0175% and Elixir of Cinchona Alkaloids, Iron and Bismuth.

Q.—What is it therapeutically, and the dose?
A.—Tonic and stimulant; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Cinchona Alkaloids, Iron and Bismuth?**

A.—Glycerite of Bismuth 6.5% and Elixir of Cinchona Alkaloids and Iron.

Q.—What is it therapeutically, and the dose?

A.—Tonic; slightly astringent, dose 8 mils.

Q.—What is there in **Elixir of Cinchona Alkaloids, Iron and Calcium Lactophosphate?**

A.—Potassium Citrate 3%, Syrup of Calcium Lactophosphate 50%, with Elixir of Cinchona Alkaloids and Iron.

Q.—What is the Potassium Citrate for?

A.—To prevent the precipitation of the several ingredients, particularly the iron when the acid syrup of calcium lactophosphate is added.

Q.—What is the Elixir therapeutically, and the dose?

A.—Tonic; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir of Cinchona Alkaloids, Iron and Pepsin?**

A.—20% Glycerite of Pepsin and Elixir of Cinchona and Iron to make 100%.

Q.—What is it therapeutically, and the dose?

A.—Tonic and digestive; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir of Cinchona Alkaloids, Iron and Strychnine?**

A.—Strychnine Sulphate, 0.0175% and Elixir of Cinchona Alkaloids and Iron.

Q.—What is it therapeutically, and the dose?

A.—Tonic and stimulant; dose 4 mils or 1 fluidrachm.

Q.—What is the common name for **Compound Elixir of Corydalis?**

A.—Compound Elixir of Turkey Corn.

Q.—What is there in the Elixir?

A.—Fluidextracts of Corydalis and Stillingia, each 6%, Fluidextract of Xanthoxylum 3%, Fluidextract of Blue Flag 9%, Alcohol 12.5%, Potassium Iodide 5% in Aromatic Elixir.

Q.—What is the Elixir therapeutically, and the dose?

A.—Alterative; dose 4 mils.

Q.—What are the synonyms for **Aromatic Elixir of Eriodictyon?**

A.—Aromatic Elixir of Yerba Santa. Elixir Corrigens.

Q.—What is there in the Elixir?

A.—Fluidextract of Eriodictyon 6%, Syrup 50%, Compound Elixir of Taraxacum 44%, Pumice and Magnesium Carbonate.

Q.—What are the Pumice and Magnesium Carbonate for?

A.—The alkalinity of the Magnesium Carbonate has a tendency to saponify the resins in the Eriodictyon and with the Pumice clarifies the Elixir.

Q.—What is it therapeutically?

A.—Expectorant but generally used to mask quinine.

Q.—What is there in **Elixir of Ferric Hypophosphite?**

A.—Ferric Hypophosphite 1.65%, Potassium Citrate 2.15% in Aromatic Elixir.

Q.—Why is Potassium Citrate used?

A.—To make the Ferric Hypophosphite go into solution.

Q.—What is it therapeutically, and the dose?

A.—Tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Iron Lactate?**

A.—Ferrous Lactate 1.75%, Potassium Citrate 5.25%, in Aromatic Elixir.

Q.—What is the Potassium Citrate for?

A.—To keep the Ferrous Lactate in solution.

Q.—What is it therapeutically, and the dose?

A.—Chalybeate tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Ferri Phosphatis?**

A.—Ferric Phosphate 3.5% in Aromatic Elixir.

Q.—What is it therapeutically, and the dose?

A.—Tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Ferri Pyrophosphatis?**

A.—Ferric Pyrophosphate 3.5% in Aromatic Elixir.

Q.—What is it therapeutically, and the dose?

A.—Tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Ferric Pyrophosphate, Quinine and Strychnine?**

A.—Ferric Pyrophosphate 3.5%, Quinine Sulphate 0.875%, Strychnine 0.014%, Citric Acid, Oil of Orange, Alcohol 25%, Syrup 37.5%, Ammonia Water, and Distilled Water.

Q.—How is it put together?

A.—The Quinine Sulphate, Strychnine and Citric Acid are triturated until very finely divided, then dissolved in the Alcohol containing the Oil of Orange. The Syrup is warmed to 65° C. and stirred with the previous mixture until clear. To this add the iron which has been dissolved in water, then Ammonia Water until neutral to litmus paper.

Q.—Why is Citric Acid used?

A.—It converts the Quinine and Strychnine to Citrates, rendering them soluble.

Q.—Why is the Ammonia Water added?

A.—The solution is acid and if left that way it will cause the iron to precipitate.

Q.—Does it make any difference if a little too much Ammonia Water is added, enough to render the mixture alkaline to litmus paper?

A.—Yes, decidedly for then the alkaloids will be precipitated.

Q.—How should the test be made?

A.—Lay a piece of litmus paper on a clean piece of glass and as the Ammonia Water is dropped in stir with a glass rod, placing a drop of the Elixir on the paper with the rod after each addition until the paper shows it to be just neutral.

Q.—What color is the Elixir?

A.—Green.

Q.—What is it therapeutically, and the dose?

A.—Tonic and stimulant; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Iron, Quinine and Strychnine?**

A.—Tincture of Ferric Citro-Chloride 12.5%, Quinine Hydrochloride 0.875%, Strychnine Sulphate 0.0175%, Compound Spirit of Orange, Alcohol 24%, Glycerin 30%.

Q.—How should it be stored?

A.—In dark amber-colored bottles.

Q.—What color is the preparation?
A.—Green.

Q.—What is it therapeutically, and the dose?
A.—Tonic and stimulant; dose 4 mils or 1 fluidrachm.

Q.—What is used in making **Elixir Formatum?**
A.—Potassium Carbonate, Monohydrated Sodium Carbonate, Formic Acid, and Aromatic Elixir.

Q.—What is the Elixir therapeutically, and the dose?
A.—Tonic and diuretic; dose 8 mils or 2 fluidrachms.

Q.—What is used in making **Compound Elixir of Formates?**
A.—Monohydrated Sodium Carbonate, Magnesium, Strontium and Lithium Carbonates, Quinine, Formic Acid, Compound Spirit of Cardamom, Acetic Ether, Alcohol 10%, Glycerin 30%, and Distilled Water.

Q.—What reaction takes places between the Carbonates, Quinine, and Formic Acid?
A.—Formates of the Quinine and the metals form and go into solution, while Carbon Dioxide is given off.

Q.—What are the Acetic Ether and Compound Spirit of Cardamom for?
A.—To give flavor to the preparation.

Q.—What is the Elixir therapeutically, and the dose?
A.—Tonic and diuretic; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir Gentianæ?**
A.—Fluidextract of Gentian 3.5%, Compound Spirit of Cardamom 1.5%, Sodium Citrate 3%, Glycerin 5%, Syrup 25%, Alcohol 20%, and Distilled Water.

Q.—What is it therapeutically, and the dose?
A.—Bitter Tonic, dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Gentianæ et Ferri?**
A.—Tincture of Ferric Citro-Chloride 10%; Elixir of Gentian to 100%.

Q.—Why is Tincture of Ferric Citro-Chloride used and not the U. S. P. Tincture of Ferric Chloride?
A.—The tannin-like principles of the Gentian would be discolored and precipitated by the U. S. P. tincture, but the Tincture of Ferric Citro-Chloride does not cause such incompatibility.

Q.—What is the Elixir therapeutically, and the dose?
A.—Tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Gentianæ et Ferri Phosphatis?**
A.—Ferric Phosphate 1.75% and Elixir Gentianæ.

Q.—What is it therapeutically, and the dose?
A.—Tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Glycerinated Elixir of Gentian?**
A.—Fluidextract of Gentian 1%, Fluidextract of Taraxacum 1.5%, Acetic Ether, Phosphoric Acid, Tincture of Sweet Orange Peel, Compound Tincture of Cardamom, Glycerin 40%, Sugar 20%, and Sherry Wine.

Q.—By what other name is it known?
A.—Glycerin Tonic.

Q.—What is the dose?
A.—8 mils or 2 fluidrachms.

Q.—What is there in **Elixir Glycerophosphatum Compositum?**
A.—Solution of Sodium Glycerophosphate, Calcium Glycerophosphate, Ferric Glycerophosphate, Soluble Manganese Glycerophosphate, Quinine Glycerophosphate, Strychnine Glycerophosphate, Lactic Acid, Compound Spirit of Cardamom, Alcohol 12.5%, Glycerin 35%.

Q.—What means are used to get the Ferric and Manganese salts into solution?
A.—They are mixed with a portion of the Lactic Acid and Distilled Water, then gently heated.

Q.—How are the Quinine and Strychnine salts dissolved?
A.—By mixing them with Water containing the balance of the Lactic Acid.

Q.—What is the Elixir therapeutically, and the dose?
A.—Nerve tonic; dose 8 mils or 2 fluidrachms.

Q.—What is the synonym for **Elixir Glycyrrhizæ Aquosum?**
A.—Aqueous Elixir of Licorice.

Q.—How much Alcohol does it contain?
A.—Less than 4%.

Q.—Is Alcohol in the substance used in its preparation?
A.—No, but the Fluidextract of Glycyrrhiza contains 25% of Alcohol and there is 15% of this preparation in the Elixir.

Q.—What added flavors are in the Elixir?
A.—Stronger Orange Flower Water 20%, Compound Spirit of Cardamom 0.5%.

Q.—What preserves it against fermentation?
A.—15% Glycerin.

Q.—Where is this Elixir of particular value?
A.—As a vehicle to mask the bitter taste of Quinine, Tincture of Digitalis, and similar drugs.

Q.—What incompatibility should one always have in mind?
A.—That all licorice preparations are incompatible with acids and acid mixtures because acids precipitate the glycyrrhizin of the licorice.

Q.—What is there in **Elixir Glycyrrhizæ Aromaticum?**
A.—Fluidextract of Glycyrrhiza 12.5%, Oils of Clove, Cinnamon, Myristica and Fennel in Aromatic Elixir.

Q.—How much Alcohol does this Elixir contain?
A.—About 25%.

Q.—What is there in **Elixir Guaranæ?**
A.—Fluidextract of Guarana 20%, Aromatic Elixir 20%, Compound Elixir of Taraxacum 60%.

Q.—What is the active constituent of Guarana?
A.—Caffeine.

Q.—What is this Elixir therapeutically, and the dose?
A.—Stimulant; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Humuli?**
A.—Fluidextract of Hops 12.5%, Tincture of Vanilla 3%, Compound Elixir of Taraxacum 12.5%, and Aromatic Elixir to 100%.

Q.—What is the English name for the Elixir?
A.—Elixir of Hops.

Q.—What is it therapeutically, and the dose?
A.—Stomachic and slightly diuretic; dose 8 mils.

Q.—What is there in **Elixir Hypophosphitum?**
A.—Calcium, Sodium and Potassium Hypophosphites, Hypophosphorous Acid, Distilled Water 42%, Glycerin 3%, Compound Spirit of Cardamom, Aromatic Elixir.

Q.—What is the Elixir therapeutically and the dose?
A.—Tonic, particularly in wasting diseases; dose 8 mils.

Q.—What is there in **Elixir Hypophosphitum et Ferri?**
A.—Calcium, Sodium, Potassium and Ferric Hypophosphites, Potassium Citrate, Hypophosphorous Acid, Distilled Water, Syrup, and Aromatic Elixir.

Q.—What is the Potassium Citrate for?
A.—To get the Ferric Hypophosphite into solution.

Q.—How should the preparation be stored?
A.—In dark amber-colored bottles.

Q.—What is this Elixir therapeutically, and the dose?
A.—Tonic; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir Lithii Bromidi?**
A.—Lithium Bromide 8.5%, Syrup 20%, Distilled Water 46%, Aromatic Elixir to 100%.

Q.—What is the Elixir therapeutically, and the dose?
A.—Sedative and lithantriptic, dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir Lithii Citratis?**
A.—Lithium Citrate 8.5% in Aromatic Elixir.

Q.—What is the Elixir therapeutically and dose?
A.—Diuretic and urate solvent, dose 8 mils.

Q.—What is there in **Elixir Lithii Salicylatis?**
A.—Lithium Salicylate 8.5% in Aromatic Elixir.

Q.—What is it therapeutically, and the dose?
A.—Antirheumatic and urate-solvent; dose 8 mils.

Q.—What is there in **Elixir Pepsini?**
A.—Glycerite of Pepsin 20%, Glycerin 10%, Hydrochloric Acid 0.4% in Aromatic Elixir.

Q.—What percentage of absolute Pepsin does this make in the Elixir?
A.—1.7%.

Q.—What is the Hydrochloric Acid for?
A.—It makes the Pepsin more active.

Q.—What is the preparation therapeutically, and the dose?
A.—Digestive; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir Pepsini, Bismuthi et Strychninæ?**
A.—Strychnine alkaloid 0.0175%, Tartaric Acid 0.0175% in Elixir of Pepsin and Bismuth.

Q.—What is the Tartaric Acid for?
A.—It converts the Strychnine alkaloid into Strychnine Tartrate which is more readily soluble in the Elixir.

Q.—What is the preparation therapeutically, and the dose?
A.—Digestive and stimulant; tonic, dose 4 mils.

Q.—How much Strychnine does this give in a dose?
A.—0.0007 Gm. or 1/85 gr.

Q.—What is there in **Elixir Pepsini et Bismuthi?**
A.—Pepsin 0.85%, Glycerin 12.5%, Glycerite of Bismuth 12.5%, Distilled Water 25%, Tincture of Caramel and Aromatic Elixir.

Q.—If the preparation is decidedly acid, what must be done with it?
A.—It must be nearly neutralized with Sodium Hydroxide.

Q.—Why should this be done?
A.—If decidedly acid the bismuth salts are readily soluble and remain so when taken into the stomach. Bismuth is of value only when insoluble in the alimentary tract where it acts as a protective, hence the Elixir must be nearly neutral so the basic salts may be formed directly after administration.

Q.—What is there in **Elixir Pepsini et Ferri?**
A.—Tincture of Ferric Citro-Chloride 7.5% in Elixir of Pepsin.

Q.—What is this preparation therapeutically, and the dose?
A.—Digestive and tonic; dose 8 mils or 2 fluidrachms.

Q.—Need the pharmacist keep all of these Pepsin elixirs ready prepared at all times?
A.—No; having Elixir of Pepsin and Pepsin and Bismuth the others can be prepared as needed.

Q.—What is the synonym for **Elixir Pepsini et Rennini Compositum?**
A.—Essence of Pepsin.

Q.—What is there in it?
A.—Pepsin 2.25%, Rennin 1.65%, Lactic Acid 0.2%, Tinct. of Sweet Orange Peel, Glycerin 15%, Alcohol, 20%, Oil of Myristica, and Distilled Water.

Q.—What is the preparation therapeutically, and the dose?
A.—Digestive; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir of Phosphorus?**
A.—Phosphorus 0.025%, Chloroform 0.5%, Alcohol 34%, Glycerin 30%, flavored with Compound Spirit of Orange and Oil of Anise and about 35% of Distilled Water.

Q.—What precaution must be used in cutting and weighing the Phosphorus?
A.—It must be cut and weighed under water.

Q.—Why is this necessary?
A.—Because it oxidizes in the air with such rapidity that it takes fire.

Q.—Why is Chloroform used in making the Elixir?
A.—Because it is a much better solvent for Phosphorus than Alcohol or Glycerin.

Q.—Should the preparation be dispensed after standing for some time?
A.—No, for under the most favorable conditions the Phosphorus will oxidize, then it is not active.

Q.—What is the preparation therapeutically, and the dose?
A.—Tonic to promote bone growth and in various nervous diseases; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Phosphorus and Nux Vomica?**
A.—Tincture of Nux Vomica 3.5% in Elixir of Phosphorus.

Q.—What is it therapeutically, and the dose?
A.—Tonic and stimulant; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Potassium Acetate?**
A.—Potassium Acetate 8.5% in Aromatic Elixir.

Q.—What is the Elixir therapeutically, and the dose?
A.—Diuretic and antacid; dose 15 mils or 4 fluidrachms.

Q.—What is there in **Elixir Potassii Acetatis et Juniperi?**
A.—Potassium Acetate 8.5%, Fluidextract of Juniper 12.5% in Aromatic Elixir.

Q.—What is it therapeutically, and the dose?
A.—Diuretic; dose 15 mils or 4 fluidrachms.

Q.—What is there in **Elixir Potassii Bromidi?**
A.—Potassium Bromide 17.5%, Syrup 20%, Distilled Water 46%, and Aromatic Elixir.

Q.—What alternative is permitted in this formula?
A.—If a colored Elixir is preferred, 1.5% of Tincture of Cudbear Compound may be used in the place of the same volume of Aromatic Elixir.

Q.—What is the Elixir therapeutically, and the dose?
A.—Sedative; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir of Quinine Valerate and Strychnine?**
A.—Quinine Valerate 1.75%, Strychnine Sulphate 0.0175%, Compound Tincture of Cudbear 1.5%, and Aromatic Elixir.

Q.—What is it therapeutically, and the dose?
A.—Tonic and stimulant; dose 4 mils or 1 fluidrachm.

Q.—How much Quinine and Strychnine does this give in each dose?
A.—Quinine 0.070 Gm. or 1$\frac{1}{6}$ gr.; Strychnine 0.0007 Gm. or $\frac{1}{85}$ gr.

Q.—What is the English name for **Elixir Rubi Compositum?**
A.—Compound Elixir of Blackberry.

Q.—What is used in making it?
A.—Rubus 1.6%, Nutgall 1.6%, Saigon Cinnamon 1.6%, Clove 0.4%, Mace and Jamaica Ginger each 0.2%, Syrup of Blackberry Fruit 75%, Diluted Alcohol.

Q.—How is it prepared?
A.—The drugs are moistened and extracted by percolation in the usual way with Diluted Alcohol to 25% of percolate which is mixed with the Syrup.

Q.—What is the Elixir therapeutically, and the dose?
A.—Astringent and antidiarrhœal; dose 15 mils.

Q.—What is there in **Elixir Sodii Bromidi?**
A.—Sodium Bromide, 17.5%, Syrup 20%, Distilled Water 46%, Aromatic Elixir to 100%.

Q.—What is it therapeutically, and the dose?
A.—Sedative; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Elixir Sodii Hypophosphitis?**

A.—Sodium Hypophosphite 3.5%, Hypophosphorous Acid 0.4% in Aromatic Elixir.

Q.—What is the Hypophosphorous Acid for?

A.—Hypophosphites tend to oxidize to phosphates, the acid keeps the sodium salt as the hypophosphite.

Q.—What is the Elixir therapeutically, and the dose?

A.—Tonic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Sodii Salicylatis?**

A.—Sodium Salicylate 8.5%, Syrup 20%, Distilled Water 46%, and Aromatic Elixir.

Q.—What is the Elixir therapeutically, and the dose?

A.—Antirheumatic; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Sodii Salicylatis Compositum?**

A.—Sodium Salicylate 8%, Fluidextract of Cimicifuga 3.2%, Fluidextract of Gelsemium 1.6%, Potassium Iodide 1.5% in Aromatic Elixir.

Q.—What is it therapeutically, and the dose?

A.—Antirheumatic and alterative; dose 4 mils.

Q.—What is there in **Elixir Strychninæ Valeratis?**

A.—Strychnine Valerate 0.0175%, Tincture of Vanilla 1.5%, Compound Tincture of Cudbear 1.5%, and Aromatic Elixir.

Q.—What is it therapeutically, and the dose?

A.—Nerve tonic; dose 4 mils or 1 fluidrachm.

Q.—What is the common name for **Elixir Taraxaci Compositum?**

A.—Compound Elixir of Dandelion.

Q.—What is there in the Elixir?

A.—Fluidextract of Taraxacum 3.5%, Fluidextract of Wild Cherry 2%, Fluidextract of Glycyrrhiza 6%, Tincture of Sweet Orange Peel 6%, Tincture of Cinnamon 3%, Compound Tincture of Cardamom 3% in Aromatic Elixir.

Q.—What is it used for?

A.—Largely as a vehicle for laxative and tonic mixtures.

Q.—What is it therapeutically, and the dose?

A.—Bitter tonic and aperient; dose 8 mils.

Q.—What is in **Elixir of Terpin Hydrate?**

A.—Terpin Hydrate 1.75%, Tincture of Sweet Orange Peel 2%, Spirit of Bitter Almond, 5%, Alcohol 42.5%, Glycerin 40%, Syrup 10%.

Q.—What is the reason for the large proportion of Glycerin?

A.—This takes the place of Syrup, made necessary because the Terpin Hydrate is not soluble in the Syrup, and also because the Alcohol necessary in the Elixir would precipitate the Sugar from a larger quantity of Syrup.

Q.—What is it therapeutically, and the dose?

A.—Expectorant and stimulant to mucous surfaces; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir of Terpin Hydrate and Codeine?**

A.—0.2% of Codeine in Elixir of Terpin Hydrate.

Q.—What is it therapeutically, and the dose?

A.—Cough sedative; dose 4 mils or 1 fluidrachm.

Q.—Can this be sold without a prescription and not violate the Harrison Antinarcotic Act?

A.—Yes, for there is a little less than 1 grain of Codeine to the fluid ounce.

Q.—What is the common name for **Elixir Terpini Hydratis et Diacetylmorphinæ?**

A.—Elixir of Terpin Hydrate and Heroin.

Q.—What does it contain?

A.—0.027% of Heroin in Elixir of Terpin Hydrate.

Q.—What is it therapeutically, and the dose?

A.—Cough sedative; dose 4 mils or 1 fluidrachm.

Q.—Can this be sold without a prescription?

A.—Yes, as it contains less than the amount of Heroin permitted in a liquid mixture by the Harrison Antinarcotic Act.

Q.—Which of these Elixirs is probably the most desirable as a cough sedative?

A.—Probably Elixir of Terpin Hydrate with Codeine, as this is less likely to develop a drug habit.

Q.—What can you say of the one containing Heroin?

A.—This is probably more active as a sedative but is much more likely to cause a drug habit.

Q.—What is the English name for **Elixir Trium Bromidorum?**
A.—Elixir of Three Bromides.

Q.—What does it contain?
A.—8% each of Ammonium, Potassium and Sodium Bromide, 0.2% Cudbear in Compound Elixir of Almond.

Q.—What is it therapeutically?
A.—Nerve sedative.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Vanillini Compositum?**
A.—Compound Spirit of Vanillin 2%, Alcohol 8%, Glycerin 2.5%, Syrup 30%, Tincture of Caramel 2%, Distilled Water.

Q.—What particular use is made of it?
A.—Used as vehicle because of its low alcoholic content and very agreeable flavor.

Q.—What is the common name for **Elixir Viburni Opuli Compositum?**
A.—Compound Elixir of Cramp Bark.

Q.—What is there in it?
A.—7.5% each of Fluidextract of Viburnum Opulus and Aletris and 15% of Fluidextract of Trillium in Compound Elixir of Taraxacum.

Q.—What is it therapeutically, and the dose?
A.—Antispasmodic, tonic, and alterative; dose 4 mils.

Q.—What is the common name for **Elixir Viburni Prunifolii?**
A.—Elixir of Black Haw.

Q.—What does it contain?
A.—12.5% Fluidextract of Viburnum Prunifolium, 7.5% Compound Tincture of Cardamom in Aromatic Elixir.

Q.—What is it therapeutically, and the dose?
A.—Uterine sedative; dose 4 mils or 1 fluidrachm.

Q.—What is there in **Elixir Zinci Valeratis?**
A.—Zinc Valerate 1.75%, Citric Acid 5.6%, Alcohol 12.5%, Spirit of Bitter Almond 1%, Compound Tincture of Cudbear 1.5%, Stronger Ammonia Water, Distilled Water, Aromatic Elixir.

Q.—Why are the Citric Acid and Stronger Ammonia Water used?

A.—To form Ammonium Citrate.

Q.—Why is this necessary?

A.—To prevent the precipitation of the Zinc.

Q.—What is the Elixir therapeutically, and the dose?

A.—Nerve sedative; dose 4 mils or 1 fluidrachm.

GLYCERITA—GLYCERITES

Q.—Define Glycerites.

A.—Solutions of medicinal substances in Glycerin.

Q.—How must they be stored?

A.—In tightly closed containers, because glycerin is hygroscopic and absorbs moisture from the air readily thus reducing the strength of the preparation.

Q.—Why are the Glycerites of particular value?

A.—Glycerin being a good solvent and antiseptic, the glycerites are not subject to fermentation or precipitation. The drug being already in solution in glycerin goes into solution in other solvents more readily.

Q.—By what methods are the Glycerites prepared?

A.—(1) Simple Solution or Admixture, (2) Solution with the aid of Heat, (3) By Extraction, (4) Chemical Reaction, (5) Solution by Intervention, (6) Saponification.

Q.—How many Glycerites are official?

A.—Five in the U. S. P. and six in the N. F.

Q.—How is **Glyceritum Acidi Tannici** prepared?

A.—By Solution with the aid of heat.

Q.—What heat is used?

A.—The heat of boiling water.

Q.—What is the strength of this Glycerite?

A.—20% Tannic Acid.

Q.—What is it therapeutically, and the dose?

A.—Astringent, dose 2 mils or 30 minims.

Q.—What care must be taken when preparing this Glycerite?
A.—Avoid all contact with iron because black iron tannate would form.

Q.—What is the Latin title for **Glycerite of Starch?**
A.—Glyceritum Amyli.

Q.—What is its strength?
A.—10%.

Q.—How is the Starch first treated?
A.—Rubbed to a smooth paste with an equal weight of Water.

Q.—What is then done with it?
A.—It is added to the Glycerin which has been heated to 140° C.

Q.—Is the Starch soluble in the water?
A.—No.

Q.—Why must the Glycerin be heated to such a high degree?
A.—To break the envelope of the starch grain so it will be dissolved in the Glycerin.

Q.—What is the maximum temperature to which it may be heated?
A.—Not to exceed 144° C., as the starch will burn.

Q.—Why must the mixture be constantly stirred while heating?
A.—To avoid scorching the starch.

Q.—How may one tell when the Glycerite is finished?
A.—When the mixture has lost all traces of opaqueness and is a glass-clear jelly.

Q.—What use is made of this Glycerite?
A.—Principally as an excipient in pill masses, also as a vehicle for ointments in skin diseases; as a vehicle for nongreasy antichap creams; as a vehicle of enemas.

Q.—Why is it used as an ointment vehicle?
A.—It will not become rancid and is readily removed from the skin with a wet cloth.

Q.—By what other names is the Glycerite known?
A.—Unguentum Glycerini; Plasma.

Q.—Is it ever given internally?
A.—No, the U. S. P. gives no dose.

Q.—Which U. S. P. Glycerite is made by Chemical Reaction?
A.—Glyceritum Boroglycerini.

Q.—What is used in making this Glycerite?
A.—Boric Acid and Glycerin.

Q.—May this be said to be a Glycerite of Boric Acid?
A.—No, because there is a chemical reaction between the boric acid and the first portion of glycerin which forms a definite compound called "glyceryl borate" or "boroglycerin."

Q.—What percentage of Boric Acid is used?
A.—31%.

Q.—What percentage of Glycerin is first used?
A.—46%.

Q.—How is it put together?
A.—The glycerin is heated to 140° C., and the boric acid is added in divided portions and stirred until dissolved. Heat is continued at not to exceed 150° C., until the weight is reduced to 50% of the finished product sought, then an equal weight of glycerin is added.

Q.—What is the reaction which takes place?
A.—$C_3H_5(OH)_3 + H_3BO_3 = C_3H_5BO_3 + 3 \cdot H_2O$.
Glycerin + Boric Acid = Glyceryl Borate + Water.

Q.—What is the strength of this preparation?
A.—50% of Boroglycerin.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What happens when this preparation is mixed with water?
A.—It hydrolyzes into boric acid and glycerin and if water is present in an amount less than 18 parts to 1 part of boric acid, the excess of boric acid is precipitated.

Q.—What prescription combination sometimes gives trouble?
A.—When this glycerite is prescribed in solution with sodium bicarbonate. The free boric acid which forms decomposes the bicarbonate liberating carbon dioxide.

Q.—Is this Glycerite ever given internally?
A.—No, the U. S. P. gives no dose.

Q.—Which Glycerite is made by Extraction?
A.—Glycerite of Hydrastis.

Q.—Which Glycerite is called the 100% Glycerite?
A.—Glycerite of Hydrastis.

Q.—Why is it so-called?
A.—Because the formula directs that about 1000 mils of the Glycerite be obtained from 1000 Gm. of the drug.

Q.—How is the strength of the Glycerite determined?
A.—By assay for the quantity of ether-soluble alkaloids.

Q.—What is the synonym for this Glycerite?
A.—Glycerite of Golden Seal.

Q.—What is the Hydrastis extracted with?
A.—Alcohol.

Q.—What is then done with the percolate?
A.—Nearly all the alcohol is removed by evaporation or distillation.

Q.—What is done with the resulting thick, concentrated liquid?
A.—It is poured into 45% of ice-cold water and allowed to stand for 24 hours.

Q.—What is next done with it?
A.—It is filtered and a portion of the filtrate assayed to find how much ether-soluble alkaloids it contains.

Q.—After ascertaining the weight of alkaloid, what is done?
A.—Enough cold water is added to make each 100 mils of the liquid contain 2.5 Gm. of ether-soluble alkaloids.

Q.—Does this not make the preparation much too strong?
A.—Yes, but it is not finished.

Q.—What is finally done with it?
A.—An equal volume of glycerin is added, so this should make the preparation just half the first strength, or each 100 mils should contain 1.25 Gm. alkaloids.

Q.—What does the U. S. P. require as to the strength of this Glycerite?
A.—Each 100 mils must yield not less than 1.12 Gm. nor more than 1.37 Gm. of ether-soluble alkaloids.

Q.—Why is the alcoholic extract poured into ice water?
A.—The alcohol extracts an inert resin from the hydrastis which must be removed from the extract. As resins are insoluble

in water the extract is poured in to precipitate it and it is then filtered out.

Q.—Why is it desirable to remove the resin?
A.—The Glycerite is expected to make a clear solution with water and of course if the resin is present it will form a cloudy mixture.

Q.—What is it therapeutically?
A.—Tonic and astringent.

Q.—Is the Glycerite ever given internally?
A.—It may be and the dose is 2 mils but it is more often used for local application.

Q.—By what other name is this preparation called?
A.—Fluid Hydrastis.

Q.—What is used in making **Glyceritum Phenolis?**
A.—Liquefied Phenol 20%, Glycerin 80%.

Q.—What is the strength of Liquefied Phenol?
A.—87% of absolute Phenol.

Q.—What is the synonym for this Glycerite?
A.—Glycerite of Carbolic Acid.

Q.—What process is used in making the Glycerite?
A.—Simple admixture.

Q.—What is the Glycerite therapeutically?
A.—Internally antiseptic and antiemetic, externally antiseptic.

Q.—What is the dose of the Glycerite?
A.—0.3 mil or 5 minims.

Q.—Is the Glycerite poisonous?
A.—Yes.

N. F. GLYCERITES

Q.—Name the N. F. Glycerites.
A.—Glyceritum Bismuthi.
Guaiaci.
Pepsini.
Picis Liquidæ.
Tragacanthæ.
Vitelli.

Q.—Which one is made by Chemical Reaction?
A.—**Glycerite of Bismuth.**

Q.—What is the assay requirement of this Glycerite?
A.—Each 100 mils must yield not less than 12.8 Gm. of bismuth oxide.

Q.—What is used in making the Glycerite?
A.—Bismuth Subnitrate, Tartaric Acid, Nitric Acid, Sodium Bicarbonate, Glycerin, and Distilled Water.

Q.—Why is the Bismuth Subnitrate dissolved in the Nitric Acid?
A.—To convert it into a normal nitrate which is soluble.

Q.—What form of Bismuth is in the finished product?
A.—Bismuth Tartrate.

Q.—What other salt is present?
A.—Sodium Tartrate.

Q.—What is it therapeutically?
A.—Slightly astringent.

Q.—Which Glycerite is made by Saponification?
A.—**Glyceritum Guaiaci.**

Q.—What is used in making this Glycerite?
A.—Guaiac, Solution of Potassium Hydroxide, Glycerin, and Water.

Q.—How is it put together?
A.—The Solution of Potassium Hydroxide is diluted with Water and to this the Guaiac is added and allowed to stand for 24 hours. It is then filtered and to the filtrate 60% of Glycerin is added, then enough Water to make 100%.

Q.—To what class of natural products does Guaiac belong?
A.—Resins.

Q.—Is it water-soluble?
A.—No.

Q.—Why is it mixed with Solution of Potassium Hydroxide?
A.—This converts the resinous Guaiac to a form of soap which will dissolve in water.

Q.—What is the preparation therapeutically?
A.—Alterative and laxative.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—What is the strength of **Glyceritum Pepsini?**
A.—8.5% of Pepsin.

Q.—What else is there in the preparation?
A.—Hydrochloric Acid, Glycerin, and Distilled Water.

Q.—Why is the acid present?
A.—It makes the Pepsin more active.

Q.—What pharmaceutical use is made of this preparation?
A.—It is used in making the Elixir of Pepsin.

Q.—What is it therapeutically, and the dose?
A.—Digestive; dose 3 mils or 45 minims.

Q.—What is the English name for **Glyceritum Picis Liquidae?**
A.—Glycerite of Tar.

Q.—What kind of Tar is used?
A.—Pine Tar.

Q.—What is the strength in Tar?
A.—6.3%.

Q.—How is the Tar first treated?
A.—Repeatedly washed with cold water until the washings are only slightly acid to litmus.

Q.—How is it finally put into solution?
A.—Triturated with Alcohol, Magnesium Carbonate and Glycerin, then strained.

Q.—What is the Magnesium Carbonate for?
A.—Used to clarify the solution.

Q.—How much Alcohol is used?
A.—12.5%.

Q.—What is it therapeutically?
A.—Stimulating expectorant and irritant.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—Which Glycerite is a thick jelly-like preparation?
A.—**Glycerite of Tragacanth.**

Q.—How much Tragacanth does it contain?
A.—12.5%.

Q.—What is it therapeutically?
A.—Demulcent.

Q.—What is the English name for **Glyceritum Vitelli**?
A.—Glycerite of Egg Yolk.

Q.—What is the synonym?
A.—Glyconin.

Q.—How is it made?
A.—By triturating 45% of Egg Yolk with 55% of Glycerin.

Q.—What use is made of this preparation?
A.—Used principally as an emulsifying agent.

Q.—Does this preparation spoil quickly?
A.—No, it will remain in good condition almost indefinitely.

OLEATA—OLEATES

Q.—Define Oleates.
A.—Solutions of metallic oxides or alkaloids in Oleic Acid.

Q.—What advantages do they have over Ointments?
A.—It is said that the medicament is more readily absorbed from Oleic Acid than from the ointment vehicle.

Q.—How many Oleates are official?
A.—1 in U. S. P. and 5 in N. F.; 6 in all.

Q.—How many are made from metallic oxides?
A.—One.

Q.—How many are made from alkaloids?
A.—Five.

Q.—How are the Oleates applied?
A.—Generally by inunction.

Q.—Is there any exception to this?
A.—Yes, in case of Oleate of Aconitine.

Q.—Name the U. S. P. Oleate.
A.—**Oleatum Hydrargyri.**

Q.—What is it made from?
A.—Yellow Oxide of Mercury, Alcohol, and Oleic Acid.

Q.—Why is the Alcohol used?
A.—It divides the mercuric oxide and promotes the reaction. with the Oleic Acid.

Q.—Why is it heated, but only heated to 50° C.?
A.—Heated to drive off the Alcohol but must not be heated above 50° C. as it will reduce to metallic Mercury.

Q.—What color is the finished product?
A.—A light transparent amber-color, entirely different from the yellow of the original oxide.

Q.—What is the color as usually seen in the store?
A.—Greenish or black.

Q.—What does this indicate?
A.—That the Oleate has been reduced and metallic mercury has separated.

Q.—How does the U. S. P. direct that it be stored?
A.—In tightly closed containers protected from the light.

Q.—What condition makes it unfit for use?
A.—When the fine globules of mercury are visible.

Q.—What particular use is made of this Oleate?
A.—Used for the purpose of finely dividing metallic mercury which is used in other preparations as, Mass, Ointment.

Q.—What precaution is to be observed in making this Oleate?
A.—Avoid all metallic contact.

Q.—Name the N. F. Oleates.
A.—Oleatum Aconitinæ.
Atropinæ.
Cocainæ.
Quininæ.
Veratrinæ.

Q.—What is the strength of **Oleate of Aconitine?**
A.—2%.

Q.—What is Aconitine?
A.—An alkaloid obtained from Aconite.

Q.—What can you say of the potency of this alkaloid?
A.—It is the most potent of all U. S. P. substances, the dose of the alkaloid being only 1/400 gr.

Q.—What is this Oleate therapeutically?
A.—Counterirritant, anodyne, sedative.

Q.—What precaution is directed in applying it?
A.—It must never be applied with the unprotected hand but with a small brush or swab.

Q.—Why is Olive Oil used in this and many other Oleates?
A.—As a diluent and vehicle; said by some to aid the absorption of the medicinal agent.

Q.—What is the strength of **Oleate of Atropine?**
A.—2% of Atropine.

Q.—What is Atropine?
A.—An alkaloid of Belladonna.

Q.—What else is used in the preparation of this Oleate?
A.—Alcohol, Olive Oil, and Oleic Acid.

Q.—How and why is the Alcohol used?
A.—The atropine is triturated with the Alcohol to promote the reaction between the Atropine and Oleic Acid.

Q.—Does the Alcohol remain in the preparation?
A.—No, the mixture is stirred until the alcohol evaporates.

Q.—What is it therapeutically?
A.—Anodyne.

Q.—What is the strength of **Oleate of Cocaine?**
A.—5% of Cocaine.

Q.—What is Cocaine?
A.—An alkaloid obtained from Erythroxylon Coca.

Q.—Is this the alkaloid which causes habit formation?
A.—Yes.

Q.—What else is used in making the Oleate?
A.—Alcohol, Olive Oil and Oleic Acid.

Q.—What is the Alcohol used for?
A.—To finely divide the alkaloid and thus promote reaction between it and the Oleic Acid.

Q.—What is it therapeutically?
A.—Local anesthetic.

Q.—What is the strength of **Oleate of Quinine?**
A.—25%.

Q.—What use is made of this preparation?

A.—It gives the tonic and antiperiodic action of Quinine by rubbing it in the arm pits and groin. May be used to advantage with children who can not be induced to take quinine because of its bitterness.

Q.—What is the strength of **Oleate of Veratrine?**

A.—2%.

Q.—What is Veratrine?

A.—A mixture of alkaloids obtained from the seed of Asagræa officinalis, commonly called sabadilla seed.

Q.—What is it therapeutically?

A.—Analgesic in neuralgia, counterirritant.

COLLODIA—COLLODIONS

Q.—Define Collodions.

A.—Solutions of Pyroxylin in a mixture of Alcohol and Ether, or solutions of medicinal substances in Collodion.

Q.—How many Collodions are official?

A.—Three in the U. S. P. and five in N. F.; eight in all.

Q.—What is Pyroxylin?

A.—Cellulose tetranitrate or Soluble Gun Cotton.

Q.—Name the U. S. P. Collodions.

A.—Collodion, Cantharidal Collodion, and Flexible Collodion.

Q.—How is **Collodion** prepared?

A.—By dissolving 4 Gm. of Pyroxylin in 25 mils of Alcohol and 75 mils of Ether.

Q.—What is it used for?

A.—As a protective in case of wounds as it is impervious to air and water; also to carry the medicaments in the medicated Collodions.

Q.—How does it act?

A.—The collodion is applied to the affected surface, the ether and alcohol evaporate and leave a covering of pyroxylin which is not easily removed, thus keeping the medicament in direct contact with the part.

Q.—What are the synonyms for **Collodium Cantharidatum?**

A.—Blistering Collodion, Vesicating Collodion.

Q.—What is its strength in Cantharides?
A.—60%.

Q.—Is 60% of powdered Cantharides mixed directly with the Collodion?
A.—No, the Cantharides is mixed with Glacial Acetic Acid and Acetone and macerated for 24 hours. It is then exhausted with additional Acetone. The percolate is then reduced by distillation until it weighs 15% of the finished product, then 85% of Flexible Collodion is added.

Q.—Why are Glacial Acetic Acid and Acetone used?
A.—They extract the Cantharidin which is the active constituent of the Cantharides.

Q.—How long does it take this to produce a blister?
A.—From six to eight hours.

Q.—What is used in making **Flexible Collodion?**
A.—Collodion 95%, Camphor 2%, and Castor Oil 3%.

Q.—What advantage does this possess over Collodion?
A.—The film which is deposited is not so easily broken.

Q.—Name the Collodions of the N. F.
A.—Collodium Iodi.
Iodoformi.
Salicylicum Compositum.
Stypticum.
Tiglii.

Q.—What is the strength of **Iodine Collodion?**
A.—5% of Iodine.

Q.—How is it prepared?
A.—5% of iodine is weighed into a bottle, then the flexible collodion is added and shaken until the iodine dissolves.

Q.—What is this therapeutically?
A.—Antiseptic and irritant.

Q.—What is the strength of **Iodoform Collodion?**
A.—5% of Iodoform in Flexible Collodion.

Q.—How is it prepared?
A.—By agitation in a bottle.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is in Compound Salicylic Collodion?
A.—11% Salicylic Acid, 10% Fluidextract Cannabis in Flexible Collodion.

Q.—How is it prepared?
A.—The ingredients are mixed in a tared bottle and shaken to solution.

Q.—What is this Collodion used for?
A.—Almost exclusively for the treatment of corns.

Q.—What color is the preparation?
A.—Generally green when first made but after standing the light causes it to assume a brown color.

Q.—What is there in **Styptic Collodion?**
A.—20% of Tannic Acid and 80% of Flexible Collodion.

Q.—How is it prepared?
A.—By shaking the ingredients together in a bottle.

Q.—What is the English name for **Collodium Tiglii?**
A.—Croton Oil Collodion.

Q.—What is its strength?
A.—10% of Croton Oil in Flexible Collodion.

Q.—What is it therapeutically?
A.—Rubifacient and vesicant.

Q.—What precautions should be observed in the use of Collodions?
A.—They should be kept tightly corked when not in use, in a cool place, and never used near a flame.

Q.—Why these precautions?
A.—The ether is very volatile, hence easily evaporates leaving the medicinal substance in a solid lump in the pyroxylin. The ether is also very inflammable hence if used near a flame is likely to take fire.

Q.—Can any of the Collodions be mixed with Water?
A.—No, for water immediately precipitates the pyroxylin.

Q.—What is to be done if they happen to be prescribed with Ammonia Water?
A.—Spirit of Ammonia is of the same strength as the Ammonia Water and the alcohol will not precipitate the pyroxylin, hence use the Spirit.

Q.—Can Collodion be mixed with any substance in an open vessel, as a mortar?
A.—No, for the ether at once volatilizes.

MISTURÆ—MIXTURES

Q.—Define Mixtures.
A.—Liquid preparations for internal use having insoluble matter in suspension in aqueous vehicles.

Q.—How do Mixtures differ from Emulsions?
A.—In Mixtures the insoluble matter is not oily or fatty and the suspending agent is usually something other than a gum as is the case with Emulsions.

Q.—Do mixtures usually keep well?
A.—Not unless they contain a considerable quantity of alcohol. Usually sugar is the agent used to suspend the insoluble matter and of course dilute solutions of sugar quickly ferment.

Q.—When sent out, how should Mixtures always be labeled?
A.—With a "shake well" label.

Q.—Is it desirable to have potent substances in Mixtures?
A.—No, for it is impossible to have accurate dosage in this form of medication.

Q.—How many Mixtures are official?
A.—Two in the U. S. P. and twenty in the N. F., 22 in all.

Q.—How are they made?
A.—Usually by simple admixture, although two in the N. F. are made by Chemical Reaction.

Q.—Name the U. S. P. Mixtures.
A.—Mistura Cretæ, Mistura Glycyrrhizæ Composita.

Q.—What is there in **Mistura Cretæ?**
A.—Compound Chalk Powder 20%, Cinnamon Water 40%, and Water 40%.

Q.—What is there in Compound Chalk Powder?
A.—Prepared Chalk 30%, Acacia 20%, Sugar 50%.

Q.—Can Chalk Mixture be kept in stock?
A.—No, for the Acacia and Sugar in watery solution will rather quickly ferment.

Q.—What is the Cinnamon Water for?
A.—To flavor the preparation.

Q.—What use is made of Chalk Mixture?
A.—It is antacid and used in cases of diarrhœa. In these cases it covers the irritated mucous membrane with an insoluble coating of calcium carbonate and prevents further irritation by fermenting food.

Q.—Why is it necessary that Prepared and not Precipitated Chalk be used?
A.—Prepared Chalk is amorphous, while Precipitated Chalk is crystalline, therefore the Precipitated would be irritating itself instead of protective to an already irritated surface.

Q.—If a prescription bottle is returned to be refilled with Chalk Mixture, what precaution must be taken and why?
A.—The bottle should be thoroughly sterilized, because if any of the first portion of the Mixture remains it will quickly set up fermentation and render the new lot unfit for use and really harmful to the patient. The better plan is to use a clean fresh bottle.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—What is the synonym for **Mistura Glycyrrhizæ Composita**?
A.—Brown Mixture.

Q.—How is this synonym frequently miscalled?
A.—Brown's Mixture.

Q.—What other common name does it have?
A.—Mistura Fusca.

Q.—What does it contain?
A.—Pure Extract of Licorice 3%, Syrup 5%, Acacia 3%, Tartar Emetic 0.024%, Paregoric 12%, Sweet Spirit of Niter 3%.

Q.—Is it all right to use the hard, black sticks of licorice known as "Extract of Licorice" in making this preparation?
A.—No, this is the commercial extract and is said to contain a great deal of impurity.

Q.—What precaution is taken to get the Tartar Emetic into solution?
A.—It is dissolved in hot water before being added to the other ingredients.

Q.—What is it therapeutically, and the dose?
A.—Expectorant; dose 10 mils or 2½ fluidrachms.

Q.—Name the **Mixtures of the National Formulary.**
A.—Mistura Adstringens.
Ammonii Chloridi.
Camphoræ Acida.
Camphoræ Aromatica.
Carminativa.
Chloralis et Potassi Bromidi Composita.
Chloroformi et Morphinæ Composita.
Copaibæ.
Copaibæ et Opii.
Ferri Composita.
Guaiaci.
Magnesiæ, Asafoetidæ et Opii.
Olei Picis.
Oleo-Balsamica.
Opii et Chloroformi Composita.
Opii et Rhei Composita.
Opii et Sassafras.
Pectoralis, Stokes.
Rhei Alkalina.
Rhei Composita.

Q.—Name the two made by Chemical Reaction.
A.—Mistura Adstringens and Mistura Ferri Composita.

Q.—What is the synonym for **Mistura Adstringens?**
A.—Villate's Mixture.

Q.—What is there in this preparation?
A.—Solution of Lead Subacetate 10%, Copper Sulphate 6.5%, Zinc Sulphate 6.5%, Diluted Acetic Acid 85%.

Q.—What is the precipitate in this preparation?
A.—Probably lead sulphate.

Q.—Is this precipitate to be dispensed or rejected?
A.—It is to be shaken and dispensed.

Q.—Is the Mixture ever given internally?
A.—Never, it is used principally as an external application in veterinary practice.

Q.—What is the synonym for **Mistura Ammonii Chloridi?**
A.—Mistura Solvens Simplex.

Q.—What is there in it?
A.—2.5% each Ammonium Chloride and Pure Extract of Glycyrrhiza in Water.

Q.—What is it therapeutically, and the dose?
A.—Expectorant, dose 8 mils or 2 fluidrachms.

Q.—What are the synonyms for **Mistura Camphoræ Acida?**
A.—Mistura Antidysenterica. Hope's Mixture.

Q.—What does it contain?
A.—Nitric Acid 1.75%, Tinct. Opium 1.2% in Camphor Water.

Q.—What is it therapeutically and dose?
A.—Antidiarrheal, dose 8 mils or 2 fluidrachms.

Q.—What is the synonym for **Mistura Camphoræ Aromatica?**
A.—Parrish's Camphor Mixture.

Q.—What does it contain?
A.—Compound Tincture of Lavender 25%, Sugar 3.5% in Camphor Water.

Q.—What is it therapeutically?
A.—Carminative, dose 8 mils or 2 fluidrachms.

Q.—What is the synonym for **Mistura Carminativa?**
A.—Dalby's Carminative.

Q.—What does it contain?
A.—Magnesium Carbonate 6.5%, Potassium Carbonate 0.3% Tinct. Opium 2.5%, Oils of Caraway, Fennel and Peppermint, Syrup 16% in Water.

Q.—What is it therapeutically, and the dose?
A.—Generally used for small children as antacid, carminative and antidiarrheal; dose 0.5 mil or 8 minims.

Q.—What is the synonym for **Mistura Chloralis et Potassii Bromidi Composita?**
A.—Chloral and Bromide Compound.

Q.—What does it contain?
A.—Hydrated Chloral and Potassium Bromide each 20%, Extract of Cannabis and of Hyoscyamus each 2%, Pumice as a clarifying agent, and Water.

Q.—What proprietary preparation is similar to this?
A.—Bromidia.

Q.—What is it therapeutically?
A.—Hypnotic and sedative, dose 4 mils or 1 fluidrachm.

Q.—What is it incompatible with?
A.—Alkalies and alcohol.

Q.—What is the synonym for **Mistura Chloroformi et Morphinae Composita?**
A.—Chloroform Anodyne.

Q.—What does it contain?
A.—Chloroform 12.5%, Ether 3.25%, Tinct. Cannabis 18.5%, Tinct. Capsicum 2.5%, Morphine Sulphate 0.25%, Oil of Peppermint, Glycerin 12.5%, Water 6.5%, Alcohol to 100%.

Q.—What is it therapeutically, and the dose?
A.—Anodyne, and antispasmodic, dose 2 mils or 30 minims.

Q.—What is the synonym for **Mistura Copaibæ?**
A.—Lafayette Mixture.

Q.—What does it contain?
A.—Copaiba 12.5%, Sweet Spirit of Niter 12.5%, Compound Tincture of Lavender 12.5%, Solution of Potassium Hydroxide 3.2%, Syrup 30%, Mucilage of Acacia to 100%.

Q.—Why is the Copaiba first mixed with the Solution of Potassium Hydroxide?
A.—The Copaiba is saponified and more readily suspended by the Syrup and Mucilage.

Q.—What is it therapeutically, and the dose?
A.—Diuretic and stimulant to mucous surfaces; dose 8 mils.

Q.—What is the synonym for **Mistura Copaibæ et Opii?**
A.—Chapman's Mixture.

Q.—Which contains the more Copaiba, Lafayette or Chapman's Mixture?
A.—Chapman's Mixture contains twice as much as Lafayette.

Q.—What is there in Chapman's Mixture?
A.—Copaiba 25%, Spirit of Nitrous Ether 25%, Compound Tincture of Lavender 6.5%, Tincture of Opium 3.2%, Mucilage of Acacia 12.5%, Water to 100%.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the synonym for **Mistura Ferri Composita?**
A.—Griffith's Mixture.

Q.—What is it made from?
A.—Ferrous Sulphate, Myrrh, Sugar, Potassium Carbonate, Spirit of Lavender, Rose Water.

Q.—What salt does the Mixture depend upon for its therapeutic value?
A.—Ferrous Carbonate.

Q.—How does Ferrous Carbonate form?
A.—By reaction between Ferrous Sulphate and Potassium Carbonate.

Q.—What is the Sugar for?
A.—This retards oxidation of the Ferrous salt.

Q.—What is the Myrrh for?
A.—This is a gum-resin and when triturated with water forms a mucilage which is an aid in suspending the iron carbonate, also it is in itself a stimulant.

Q.—How is the Ferrous Sulphate put into the mixture?
A.—It is first dissolved in a part of the Rose Water then the solution added to the other mixture.

Q.—What is the color of the Mixture?
A.—Greenish.

Q.—Is the color always the same.
A.—No.

Q.—What is the cause for the variation in color?
A.—The color depends largely on the myrrh used. It is vegetable exudation, hence may contain tannin, of course the more tannin it contains the darker and muddier will be the Mixture.

Q.—What kind of Myrrh should be used?
A.—Clear, amber-like pieces. The darker the pieces the darker will be the mixture.

Q.—What color change will take place in this Mixture after standing for a time?
A.—It will assume a brownish color due to the oxidation of the ferrous iron to ferric.

Q.—Can this Mixture be kept in stock?
A.—No, it must be freshly made when wanted and the N. F. so directs.

Q.—What is it therapeutically, and the dose?
A.—Hematinic; dose 15 mils or 4 fluidrachms.

Q.—What is there in **Mistura Guaiaci?**
A.—Tinct. Guaiac 12.5%; Clarified Honey 25%; in Cinnamon Water.

Q.—What is the Honey for?
A.—It suspends the Guaiac.

Q.—Will the Guaiac precipitate when the Cinnamon Water is added?
A.—Yes, but the Honey prevents its precipitation in masses, so it can be readily shaken into suspension.

Q.—What is it therapeutically, and the dose?
A.—Alterative, mild diuretic and laxative; dose 15 mils.

Q.—What is the synonym for **Mistura Magnesiæ, Asafoetidæ et Opii?**
A.—Dewees' Carminative.

Q.—What is there in it?
A.—Magnesium Carbonate 5%, Tinct. Asafetida 7.5%, Tinct. Opium 1%, Sugar 10% in water to 100%.

Q.—What is it therapeutically, and the dose?
A.—Carminative and antidiarrheal; dose 8 mils.

Q.—What are the synonyms for **Mistura Olei Picis?**
A.—Mistura Picis Liquidæ. Tar Mixture.

Q.—What is there in it?
A.—Rectified Oil of Tar 3.5%, Pure Extract of Licorice 6.5%, Sugar 25%, Chloroform 1%, Oil of Peppermint 0.3%, Alcohol 16%, Water to 100%.

Q.—What is it therapeutically, and the dose?
A.—Expectorant; dose 8 mils or 2 fluidrachms.

Q.—What is there in **Mistura Oleo-Balsamica?**
A.—Eugenol, Oils of Lavender, Thyme, Cinnamon, Lemon and Myristica each 0.4%, Balsam Peru 1.6% in Alcohol.

Q.—What is it therapeutically?

A.—Local stimulant.

Q.—What is the synonym for **Mistura Opii et Chloroformi Composita?**

A.—Squibb's Diarrhœa Mixture.

Q.—Why was this synonym given to it?

A.—Because the formula was devised and published by Dr. E. H. Squibb of New York, when cholera was prevalent in this country.

Q.—What is there in the Mixture?

A.—Tinct. Opium and Spt. Camphor each 20%, Tinct. Capsicum 10%, Chloroform 8%, Alcohol to 100%.

Q.—What is it therapeutically, and the dose?

A.—Antidiarrheal; dose 2 mils or 30 minims.

Q.—What is the synonym for **Mistura Opii et Rhei Composita?**

A.—Sun Cholera Mixture.

Q.—How did it get this synonym?

A.—The formula was published in the "New York Sun," when cholera was epidemic in this country.

Q.—What is there in the Mixture?

A.—Tinct. Capsicum, Tinct. Rhubarb each 10%, Tinct. Opium, Spt. Camphor and Spt. Peppermint each 20%, Alcohol to 100%.

Q.—What are the synonyms for **Mistura Opii et Sassafras?**

A.—Mistura Opii Alkalina; Godfrey's Cordial.

Q.—What does it contain?

A.—Tinct. Opium 3.5%, Oil of Sassafras 0.1%, Alcohol 5%, Potassium Carbonate 0.8%, Syrup 32.5%, Water to 100%.

Q.—What is it therapeutically, and the dose?

A.—Sedative; dose for infants 0.3 mil or 5 minims.

Q.—What is the English name for **Mistura Pectoralis, Stokes?**

A.—Stoke's Expectorant.

Q.—What is there in it?

A.—Ammonium Carbonate 1.75%, Fluidextract of Senega and of Squill each 3.5%, Paregoric 17.5%, Water 8.5%, Syrup of Tolu to 100%.

Q.—What is the dose?

A.—4 mils.

Q.—What are the synonyms for **Mistura Rhei Alkalina?**
A.—Syrupus Rhei et Potassii Compositus; Neutralizing Cordial.

Q.—What does it contain?
A.—Fluidextract of Rhubarb 1.6%, Flext. Hydrastis 0.8%, Potassium Carbonate 1.6%, Tinct. Cinnamon 6.4%, Spt. Peppermint 0.8%, Syrup 25%, Diluted Alcohol to 100%.

Q.—What is it therapeutically, and the dose?
A.—Antacid and antidiarrheal; dose 4 mils or 1 fluidrachm.

Q.—What are the synonyms for **Mistura Rhei Composita?**
A.—Mistura Rhei et Sodæ; Mixture of Rhubarb and Soda.

Q.—What is there in it?
A.—Flext. Rhubarb 1.5%, Flext. Ipecac 0.3%, Sodium Bicarbonate 3.5%, Glycerin 35%, Spt. Peppermint 3.5%, Water to 100%.

Q.—What is it therapeutically, and the dose?
A.—Laxative and antacid; dose 4 mils, or 1 fluidrachm.

LOTIONES—LOTIONS

Q.—Define Lotions.
A.—Liquid preparations for external use having insoluble matter in aqueous vehicles.

Q.—How many are official in the U. S. P.?
A.—None.

Q.—How many are official in the N. F.?
A.—Four.

Q.—Name them.
A.—Lotio Ammoniacalis Camphorata.
Flava.
Nigra.
Plumbi et Opii.

Q.—What is the English name for **Lotio Ammoniacalis Camphorata?**
A.—Ammoniated Camphor Wash.

Q.—What are the synonyms?
A.—Aqua Sedativa; Sedative Water; Eau Sedative de Raspail.

Q.—What is it made from?
A.—Sodium Chloride and Ammonia Water each 6%, Spt. of Camphor 1%, Water to 100%.

Q.—What is it therapeutically?
A.—Counter-irritant.

Q.—What is the English name for **Lotio Flava**?
A.—Yellow Lotion.

Q.—What are the synonyms?
A.—Yellow Wash; Aqua Phagedænica Flava.

Q.—What is it made from?
A.—Corrosive Sublimate 0.3%, Boiling Water 3.5%, Lime Water to 100%.

Q.—How is it put together?
A.—The corrosive sublimate is dissolved in the boiling water and then the lime water is added.

Q.—What is the precipitate which forms?
A.—Yellow Mercuric Oxide.

Q.—What causes a reddish or brownish precipitate at times?
A.—This is a basic oxide which forms because of too little calcium hydroxide in the lime water, or too much mercuric chloride has been used.

Q.—Why does not Mercuric Hydroxide form?
A.—Possibly it does momentarily but this salt can not exist in the presence of water, it hydrolyzes at once to Mercuric Oxide and Water.

Q.—What is the English name for **Lotio Nigra**?
A.—Black Lotion.

Q.—What are the synonyms?
A.—Black Wash; Aqua Phagedænica Nigra.

Q.—What is it made from?
A.—Calomel 0.875%, Water 1.5%, and Lime Water to 100%.

Q.—Is the Calomel first dissolved in the Water?
A.—No, for Calomel is not water-soluble.

Q.—How is it prepared?
A.—The calomel is triturated with the water, then the lime water is gradually added.

Q.—What is the precipitate which forms?

A.—When first made the precipitate is Mercurous Oxide, (Hg_2O) but as it stands for some time this breaks down to metallic mercury.

Q.—What are the two Mercury Lotions therapeutically?

A.—Antiseptics.

Q.—What is the meaning of the word "phagedænica?"

A.—Causing the sloughing of dead flesh as related to ulcerous sores.

Q.—What is the synonym for **Lotio Plumbi et Opii?**

A.—Lead and Opium Wash.

Q.—What is it made from?

A.—Lead Acetate, Tinct. Opium, and Water.

Q.—What is it therapeutically?

A.—Astringent and protective.

Q.—What is the precipitate which forms in this?

A.—Lead Meconate.

Q.—How can this salt form?

A.—Meconic acid is a constituent of opium, this with the soluble lead salt forms an insoluble lead meconate.

Q.—What care is to be observed in dispensing or using any of the Lotions?

A.—They must be thoroughly shaken to get the precipitate suspended.

Q.—How must prescriptions containing them be labeled?

A.—"For External Use Only. Shake Well Before Using."

GARGARISMÆ—GARGLES

Q.—How many Gargles are official?

A.—One.

Q.—Is the formula in the U. S. P. or N. F.?

A.—In the N. F.

Q.—What is the official Latin title?

A.—**Gargarisma Guaiaci Compositum.**

Q.—What is it made from?

A.—Ammoniated Tinct. Guaiac, Compound Tinct. Cinchona, Clarified Honey, Potassium Chlorate, Oil of Peppermint, Water.

Q.—How is it put together?

A.—First mix the two tinctures and the oil. Put the Honey in a graduated bottle then add the mixed tinctures and oil a little at a time, shaking after each addition. Dissolve the potassium chlorate in some warm water, add this solution to the first mixture a little at a time shaking well.

Q.—What is the Honey for?

A.—This has the property of causing the extractive matter in the tinctures to be precipitated in small flakes instead of a sticky mass, so the precipitate may be readily suspended by shaking.

Q.—Is there any way of preventing this precipitation?

A.—No, the tinctures are both alcoholic and the potassium chlorate is insoluble in alcohol, hence it is necessary to have both alcohol and water present.

Q.—Can Honey be used successfully in other mixtures containing both alcoholic and water soluble substances?

A.—Yes.

Q.—What is the official Gargle therapeutically?

A.—Antiseptic and tonic in sore throat.

LINIMENTA—LINIMENTS

Q.—Define Liniments.

A.—Solutions or mixtures of medicinal substances with alcohol or oleaginous fluids for external use intended to be applied with friction.

Q.—Name the methods by which they are prepared.

A.—Solution, (2) Solution with heat (3) Saponification (4) Chemical Reaction (5) Emulsification.

Q.—How many Liniments are official?

A.—8 in the U. S. P., 9 in the N. F., 17 altogether.

Q.—What are the synonyms for **Linimentum Ammoniæ**?

A.—Volatile Liniment. Hartshorn Liniment.

Q.—By what process is it made?

A.—Saponification.

Q.—What is it made from?
A.—25% Ammonia Water, 75% Sesame Oil.

Q.—What is the chemical name of the finished product?
A.—Ammonium Oleate.

Q.—Is this a soap?
A.—Yes.

Q.—What is there in **Belladonna Liniment?**
A.—5% Camphor and 95% Flext. Belladonna Root.

Q.—What is the English name for **Linimentum Calcis?**
A.—Lime Liniment.

Q.—What is the synonym?
A.—Carron Oil.

Q.—Where did this synonym originate?
A.—In a Scottish town named Carron where this preparation was used as a dressing for burn wounds at the numerous iron foundries.

Q.—What is it made from?
A.—Equal volumes of Raw Linseed Oil and Lime Water.

Q.—What is the process used in preparing it?
A.—Saponification.

Q.—Is the product a soap?
A.—Yes.

Q.—Which of the Liniments is assayed?
A.—**Linimentum Camphoræ.**

Q.—What is it made from?
A.—Camphor 20%, Cottonseed Oil 80%.

Q.—What is the assay requirement?
A.—Each 100 Gm. of the Liniment must yield not less than 19.5 Gm. nor more than 20.5 Gm. of Camphor.

Q.—What is the synonym for this Liniment?
A.—Camphorated Oil.

Q.—How is it prepared?
A.—The camphor is dissolved in the cottonseed oil by the heat of a water-bath.

Q.—How is **Chloroform Liniment** made?
A.—By simple admixture.

Q.—What is it made from?
A.—Chloroform 30%, Soap Liniment 70%.

Q.—What is the English name for **Linimentum Saponis?**
A.—Soap Liniment.

Q.—What is the synonym?
A.—Liquid Opodeldoc.

Q.—What is there in this Liniment?
A.—Soap 6%, Camphor 4.5%, Oil of Rosemary, Alcohol 70%, Water to 100%.

Q.—What kind of Soap must be used?
A.—The official Castile Soap which must be dry.

Q.—Why is it required to be dry?
A.—Because the official Soap may contain as much as 36% of water. Hence if the Soap were not dried there might be a deficiency of 1/3 of Soap in the Liniment.

Q.—Why is the Liniment allowed to stand 24 hours before filtering?
A.—To give the Sodium Palmitate a chance to collect as a precipitate.

Q.—What would happen if the Liniment was filtered as soon as prepared?
A.—The Sodium Palmitate is in such a finely divided condition that it would pass through the filter and later form a precipitate.

Q.—Where does the Sodium Palmitate come from?
A.—It is present in the Soap having come from the Olive Oil from which the Soap was made.

Q.—Why is a precipitate sometimes found in Soap Liniment other than the Palmitate just mentioned?
A.—Sometimes it is due to a poor quality of Soap. Also the preparation is just about a saturated solution of Soap and if a little of the liquid evaporates, it may precipitate because of supersaturation.

Q.—What is the synonym for **Linimentum Saponis Mollis?**
A.—Tincture of Green Soap.

Q.—What is it made from?
A.—65% Soft Soap, 2% Oil of Lavender, Alcohol to 100%.

Q.—What is the synonym for **Linimentum Terebinthinæ?**
A.—Kentish's Ointment.

Q.—What is it made from?
A.—65% Rosin Cerate, 35% Oil of Turpentine.

Q.—How is it prepared?
A.—The resin cerate is melted on the water-bath, then the oil of turpentine is thoroughly mixed with it.

Q.—Is it a liquid preparation?
A.—No, it is semisolid.

Q.—How should it be dispensed?
A.—In an ointment jar.

Q.—Name four U. S. P. Liniments containing Camphor.
A.—Liniment of Belladonna, Camphor, Soap, Chloroform.

Q.—Name two U. S. P. Liniments made by Saponification.
A.—Liniment of Ammonia and Lime Liniment.

Q.—Which U. S. P. liniment contains a Fluidextract?
A.—Liniment of Belladonna.

N. F. LINIMENTS

Q.—Name the N. F. Liniments.
A.—Linimentum Aconiti et Chloroformi.
Ammonii Iodidi.
Opii Compositum.
Saponato-Camphoratum.
Saponis Mollis Compositum.
Sinapis Compositum.
Terebinthinæ Aceticum.
Tiglii.
Tiglii Compositum.

Q.—What is there in Liniment of Aconite and Chloroform?
A.—Flext. Aconite 4.5%, Alcohol 8%, Chloroform 12.5%, Soap Liniment 75%.

Q.—Name the N. F. liniment made by Chemical Reaction.
A.—Liniment of Ammonium Iodide.

Q.—What is it made from?
A.—Iodine, Oil of Rosemary, Oil of Lavender, Camphor, Ammonia Water, Alcohol.

Q.—If a precipitate forms in this liniment what is to be done with it?
A.—Filter it out.

Q.—What is the synonym for **Compound Liniment of Opium?**
A.—Canada Liniment.

Q.—What does it contain?
A.—Tinct. Opium 10%, Camphor 1.75%, Oil of Peppermint 2.5%, Alcohol 25%, Fresh Egg Albumen 5%, Ammonia Water 35%, Oil of Turpentine 22%.

Q.—What is the English name for **Linimentum Saponato-Camphoratum?**
A.—Camphorated Soap Liniment.

Q.—What are the synonyms?
A.—Opodeldoc; Solid Opodeldoc.

Q.—What is it made from?
A.—Monohydrated Sodium Carbonate 1%, Stearic Acid 5%, Water 10%, Camphor 2.5%, Oils of Thyme and Rosemary, Ammonia Water 5%, Alcohol to make 100%.

Q.—Why is it called a Soap liniment when there is no soap in it?
A.—The reaction between the Sodium Carbonate and the Stearic Acid forms a soap.

Q.—What is the English name for **Linimentum Saponis Mollis Compositum?**
A.—Compound Liniment of Soft Soap.

Q.—What is the synonym?
A.—Tinctura Saponis Viridis Composita.

Q.—What is it made from?
A.—Soft Soap 15%, Oil of Cade 2%, Alcohol to 100%.

Q.—What is the English name for **Linimentum Sinapis Compositum?**
A.—Compound Liniment of Mustard.

Q.—What is it made from?
A.—Volatile Oil of Mustard 3%, Flext. Mezereum 20%, Camphor 6%, Castor Oil 15%, Alcohol to 100%.

Q.—What is the English name for **Linimentum Terebinthinæ Aceticum?**
A.—Acetic Turpentine Liniment.

Q.—What are its synonyms?
A.—Linimentum Album; Stokes' Liniment; St. John Long's Liniment.

Q.—What is it made from?
A.—Oil of Turpentine 40%, Oil of Lemon 1.6%, Acetic Acid 8%, two fresh eggs and the yolks of two others, Rose Water to make 100%.

Q.—How is it made?
A.—The oils are triturated with the eggs to emulsify them, then the acid and rose water are incorporated.

Q.—What is the English name for **Linimentum Tiglii?**
A.—Liniment of Croton Oil.

Q.—What is the synonym?
A.—Linimentum Crotonis.

Q.—What is it made from?
A.—Croton oil 13%, Oil Cajuput 43%, Alcohol 44%.

Q.—What is there in **Linimentum Tiglii Compositum?**
A.—Croton Oil, Sassafras Oil, Turpentine Oil each 20%, Olive Oil 40%.

MAGMÆ—MAGMAS

Q.—Define Magma.
A.—A thick, tenacious precipitate which is not easily separated from the last portions of water in which it has been precipitated.

Q.—What common name has been applied to Magmas?
A.—Milk.

Q.—Does this apply with equal force to all the official magmas?
A.—No, for one of them is not white.

Q.—How many are official?
A.—Three, two in the U. S. P. and one in the N. F.

Q.—How are they usually prepared?
A.—By pouring together solutions of two soluble salts.

Q.—Are they all now prepared in this manner?
A.—No, Magnesia Magma is an exception.

Q.—Name the two U. S. P. Magmas.
A.—Magma Bismuthi, Magma Magnesiae.

Q.—What is the synonym for Magma Bismuthi?
A.—Milk of Bismuth. Has also been called Bismuth Cream.

Q.—What is it made from?
A.—Bismuth Subnitrate, Nitric Acid, Ammonium Carbonate, Ammonia Water and Distilled Water.

Q.—What salts of Bismuth are in the finished product?
A.—The Hydroxide and Subcarbonate.

Q.—What should be the reaction of the mixture to litmus and phenolphthalein?
A.—Neutral.

Q.—What is the Magma assay for?
A.—Its content of Bismuth Oxide (Bi_2O_3).

Q.—How much must it yield?
A.—Not less than 6.5% or more than 7.5%.

Q.—While washing the precipitate what precaution must be observed?
A.—The surface of the magma must not become dry.

Q.—What is it used for?
A.—As a protective to the irritated mucous surfaces in diarrhea.

Q.—What is the dose?
A.—4 mils or 1 fluidrachm.

Q.—What is the synonym for **Magma Magnesiæ**?
A.—Milk of Magnesia.

Q.—What salt of Magnesium is in the finished product?
A.—Magnesium Hydroxide, $Mg.(OH)_2$.

Q.—How much Magnesium Hydroxide must the Magma yield?
A.—Not less than 6.5% or more than 7.5%.

Q.—What is it made from?
A.—Magnesium Carbonate, Sodium Hydroxide and Distilled Water.

Q.—Is the Magnesium Carbonate soluble in water?
A.—No, it is simply rubbed to a smooth thin mixture with distilled water.

Q.—In making this Magma what by-product forms?
A.—Sodium Carbonate.

Q.—How does this Magma react toward indicators?
A.—It is alkaline to litmus and phenolphthalein.

Q.—How must it be stored?
A.—In bottles tightly stoppered with corks which have been dipped in melted paraffin.

Q.—Why are the corks so treated?
A.—It prevents the ingress of air and prevents discoloration of the Magma.

Q.—What does the U. S. P. permit to be substituted for Distilled Water in washing the Magma?
A.—Water which has been boiled with magnesium carbonate and then filtered.

Q.—Why is it so treated?
A.—To remove metallic impurities, particularly iron which would discolor the Magma.

Q.—What addition to the Magma does the U. S. P. permit?
A.—One-half mil of a suitable flavoring agent to 1000 mils of the Magma.

Q.—What is it therapeutically?
A.—Laxative and antacid.

Q.—What is the dose?
A.—10 mils or 2½ fluidrachms.

Q.—Name the Magma of the National Formulary.
A.—**Magma Ferri Hydroxidi.**

Q.—What is the English name?
A.—Ferric Hydroxide Magma.

Q.—What is the synonym?
A.—Ferric Hydroxide.

Q.—What is it made from?
A.—Solution of Ferric Sulphate, Ammonia Water, Water.

Q.—What by-product forms?
A.—Ammonium Sulphate.

Q.—How are the washings tested to show freedom from Ammonium Sulphate?
A.—Add a few drops of Barium Chloride T. S. to the washings and not more than a slight cloudiness should appear.

Q.—Does it make any difference whether the Ammonia Water is poured into the Iron Solution or the Iron Solution into the Ammonia Water?
A.—Yes, the Iron Solution must always be poured into the Ammonia Water.

Q.—What difference does it make?
A.—If the Ammonia Water is poured into the Iron Solution the tendency will be to form Basic Ferrie Hydrate.

Q.—What is the principal use of this Magma?
A.—Used in the preparation of the scale salts of iron.

Q.—Why must this Magma be freshly prepared when wanted?
A.—Because it so quickly decomposes into Ferric Oxide and water.

EMULSA—EMULSIONS

Q.—Define Emulsions.
A.—Liquid preparations for internal use containing oil, fat or resinous substances suspended in water by the aid of a mucilaginous agent.

Q.—Into what two classes may Emulsions be divided?
A.—Into Natural and Artificial Emulsions.

Q.—What do you understand by a Natural Emulsion?
A.—An emulsion which may be formed without the addition of any emulsifying agent other than that contained in the substance itself.

Q.—Name such an emulsion.
A.—Emulsion of Asafetida.

Q.—Name several emulsifying agents.

A.—Acacia, tragacanth, egg yolk, mucilage of irish moss, malt extract, caseine.

Q.—Into what two classes may Artificial Emulsions be divided?

A.—Mortar emulsions and flask emulsions.

Q.—What is meant by a "flask emulsion"?

A.—One that is made in a bottle by shaking instead of rubbing in a mortar.

Q.—What kind of substances are emulsified in a flask?

A.—Volatile substances as volatile oils or chloroform.

Q.—What is the theory of emulsification?

A.—To finely divide the oil and surround each fine particle with an envelope of mucilage and in this way keep the oil suspended in water.

Q.—What is an indication of a good emulsion?

A.—A pure white color.

Q.—How is this attained?

A.—By using an agent which has the property of dividing the oil into the finest possible particles.

Q.—Which one of the emulsifying agents will best do this?

A.—Acacia.

Q.—Name the two methods used in making Mortar emulsions.

A.—The English method and the Continental method.

Q.—Which method is generally used in the United States?

A.—The Continental method.

Q.—What are the proportions used in this method?

A.—Fixed oil............4 parts.
Acacia..............1 part.
Water.............. 2 parts.

Q.—Does it make any difference how these are put together?

A.—Yes, the method of putting them together is of great importance and if this correct method is not **strictly** followed, failure is certain to result.

Q.—What kind of a mortar is best to use?

A.—A porcelain mortar with a rough interior.

Q.—What is the proper method for forming the emulsion?

A.—Rub the acacia and oil in the above proportions thoroughly together, then add the 2 parts of water all at once, pouring it in as quickly as you can without slopping it over the side. Now triturate rapidly but without pressure, until a thick, white, sticky mixture forms giving forth a clicking sound. This is the primary or "mother" emulsion. Now the diluting water may be added a little at a time until the required volume is added.

Q.—Why must 1 part of acacia and 2 parts of water be used with all fixed oil emulsions?

A.—Because in this proportion the thickest possible mucilage is formed in the quickest possible time and this is necessary to nicely emulsify the oil.

Q.—Does it make any difference whether the mortar is wet or dry in starting the emulsion?

A.—Yes, the mortar must be absolutely dry.

Q.—Do emulsions usually keep well?

A.—No, being dilute solutions of acacia they will ferment quite as quickly as mucilage of acacia.

Q.—How is it that stock emulsions and proprietary emulsions keep fairly well?

A.—They no doubt have some preservative added.

Q.—Is this a good plan?

A.—No, for if a preservative is added to prevent fermentation, it will also prevent the digestion of the medicinal substance, for digestion is nothing more or less than peptic fermentation.

Q.—What permissible preservative might be added?

A.—Glycerin or alcohol.

Q.—Can these be added in any considerable quantity?

A.—No, for they will "crack" the emulsion.

Q.—What is meant by the term "crack the emulsion"?

A.—Separate the acacia from the water which forms the mucilage, thereby permitting the oil particles to run together and collect in a layer by itself.

Q.—Is there any way to get the "cracked" emulsion back into a good emulsion?

A.—No. However the material may be saved by forming a new emulsion then adding the "cracked" emulsion gradually to it.

Q.—How may salts and syrups be added to emulsions?

A.—The required weight of the salt is dissolved in the water used for dilution. The syrup is also mixed with the diluting water if there is any.

Q.—Does syrup tend to "crack" emulsions?

A.—No, it aids the suspension of the insoluble substance.

Q.—How are alcoholic substances to be incorporated in an emulsion?

A.—They must be diluted with water as much as possible and added in small portions after the primary emulsion is formed.

Q.—Will the formula given for the emulsification of the fixed oils answer for the emulsification of volatile oils?

A.—No.

Q.—What is the rule for emulsions of volatile oils?

A.—Use the same weight of powdered acacia that there is volume of volatile oil, but of course the quantity of water must always be twice as much as the acacia.

Q.—Give an example of this.

A.—The official Emulsion of Oil of Turpentine furnishes an example but here is one in the apothecaries' system:

℞

Any Volatine Oil	1 drachm.
Acacia, powdered	1 drachm.
Water, to make	2 fluid ounces

M. et ft. emuls. sec. art.

First have a perfectly dry bottle into which the acacia is poured, now add the volatile oil and shake thoroughly. Next pour in 2 drachms of water *all at one time* and shake until the emulsion is formed, then add the balance of the water a little at a time, shaking after each addition until the required 2 ounces results.

Q.—Why is it that fixed oils are also included in volatile oil emulsions frequently?

A.—The fixed oils are more easily emulsified than the volatile oils, so the plan is to dissolve the volatile oil in the fixed oil, then emulsify it. The emulsion prepared in this manner is more permanent.

Q.—In case tragacanth is used in place of acacia, is the same formula followed?

A.—No, it is necessary to use only from $\frac{1}{10}$ to $\frac{1}{8}$ as much tragacanth as acacia but quantity of water to be added must be 20 or 25 times as much as the gum.

Q.—Why are acacia emulsions always whiter than those made with any other emulsifying agent?

A.—Because the acacia is able to more finely divide the oil particles.

Q.—Will emulsions stand long without separating?

A.—No, but they may be readily shaken into suspension again if they have been properly made.

Q.—What emulsifying agent is recommended when large proportions of alcohol are present?

A.—Glycerite of Egg Yolk.

Q.—What is the British method of emulsification?

A.—The same ingredients are used as in the Continental but the water and gum are first thoroughly mixed to form the mucilage, then the oil is added in small portions, one portion being emulsified before the next portion is added.

Q.—Why is it that fixed oils require less acacia for emulsification than volatile oils?

A.—The fixed oils are obtained by fusion or expression and with them some albuminous or proteid matter which assists in the emulsification, while volatile oils are obtained by distillation hence nothing will distil over which might assist in their emulsification.

Q.—How are emulsions of Salol, Camphor, Salicylic Acid and other water-insoluble substances prepared?

A.—These are soluble in fixed oils, hence dissolve the required weight of the substance in some bland fixed oil, as olive or expressed oil of almond, then proceed exactly the same as in preparing any fixed oil emulsion.

U. S. P. EMULSIONS

Q.—Name the U. S. P. Emulsions.

A.—Emulsum Amygdalæ; Olei Morrhuæ; Asafœtidæ; Olei Terebinthinæ.

Q.—What is the synonym for **Emulsion of Almond?**

A.—Milk of Almond.

Q.—What is used in making the Emulsion?

A.—Sweet Almond 6%, Acacia 1%, Sugar 3%.

Q.—How are the Almonds first treated?
A.—They are blanched.

Q.—What does the term "blanched" mean?
A.—The almonds are dropped into hot water for a few moments until the brown covering loosens and it is then slipped off the kernel and rejected.

Q.—What is this emulsion used for?
A.—It is a delicious flavoring vehicle.

Q.—Does it keep well?
A.—No, it is never kept in stock and the U. S. P. directs that it be freshly made.

Q.—What is the synonym for **Emulsum Asafœtidæ?**
A.—Milk of Asafetida.

Q.—What is the strength of this Emulsion?
A.—4%.

Q.—What form of Asafetida is used?
A.—Tears or selected masses; never use the powdered.

Q.—Why is the powdered not to be used?
A.—The medicinal value of asafetida is in the volatile oil which it contains and in order to powder it the volatile oil is driven off.

Q.—What is it therapeutically, and the dose?
A.—Carminative and antispasmodic; dose 15 mils.

Q.—What may be done to remove the odor from the mortar?
A.—Pour in a little alcohol and burn it; or triturate some powdered black mustard seed and water in it.

Q.—What is the English name for **Emulsum Olei Morrhuæ?**
A.—Emulsion of Cod Liver Oil.

Q.—What is the common name?
A.—Emulsum Olei Jecoris Aselli.

Q.—What is it made from?
A.—Cod Liver Oil 50%, Acacia 12.5%, Syrup 10%, Methyl Salicylate 0.4%, and Water to 100%.

Q.—Why is Methyl Salicylate used?
A.—As a flavor to cover the taste of the Cod Liver Oil.

Q.—What change in this formula is permitted by the U. S. P.?
A.—Any suitable flavor may replace Methyl Salicylate.

Q.—What is it therapeutically, and the dose?
A.—Nutritive and tonic; dose 15 mils or 4 fluidrachms.

Q.—Why is it of value in tuberculosis?
A.—It is generally readily assimilated and thus improves patient's resistance to the disease.

Q.—What is the English name for **Emulsum Olei Terebinthinæ**?
A.—Emulsion of Oil of Turpentine.

Q.—What is the strength of it?
A.—15% of Oil of Turpentine.

Q.—What kind of oil of turpentine is used?
A.—Rectified Oil of Turpentine.

Q.—How does this differ from the ordinary oil?
A.—It has been treated with Sodium Hydroxide and distilled to free it from acid and resin, thus making it less irritating.

Q.—What else is there in the Emulsion?
A.—Expressed Oil of Almond, Syrup and Acacia, and Water.

Q.—What is the Expressed Oil of Almond for?
A.—It dissolves the Oil of Turpentine and makes it emulsify more readily.

Q.—Is this a flask or mortar emulsion?
A.—A flask emulsion.

Q.—How is the Emulsion put together?
A.—Put the acacia in a dry bottle, then add the two oils and shake vigorously. Now add twice as much water as acacia and shake again until the emulsion forms, now add the syrup in divided portions, shaking each time, finally water in divided portions to make the required quantity.

Q.—What is it therapeutically?
A.—Diuretic, carminative, anthelmintic; dose 2 mils.

N. F. EMULSIONS

Q.—Name the N. F. Emulsions.
A.—Emulsion Olei Morrhuæ cum Calcii Lactophosphate.
Olei Morrhuæ cum Calcii Phosphate.
Olei Morrhuæ cum Hypophosphitibus.
Olei Morrhuæ cum Malto.

Olei Morrhuæ cum Pruno Virginiana.
Olei Morrhuæ cum Vitello.
Olei Ricini.
Petrolati.

Q.—In the preparation of these emulsions of Cod Liver Oil, what is their strength in Cod Liver Oil?

A.—50% in all but one, Cod Liver Oil with Malt which is 30%.

Q.—Why is it that no flavoring is given in the formulas?

A.—Because the N. F. gives six different formulas for flavoring these emulsions so the pharmacist may use the one which seems best to him. Likewise it gives the physician an opportunity to vary the flavor from time to time when long continued use of Cod Liver Oil is desirable.

Q.—What are included in these flavors?

A.—Oils of Betula, Sassafras, Bitter Almond, Coriander, singly and combined, and Compound Spirit of Orange.

Q.—How much Calcium Lactophosphate is there in **Emulsion of Cod Liver Oil with Calcium Lactophosphate?**

A.—5%.

Q.—Why is Lactic Acid used?

A.—It aids in dissolving the Calcium Lactophosphate.

Q.—What is the Emulsion therapeutically, and the dose?

A.—Nutritive and tonic; dose 15 mils or 4 fluidrachms.

Q.—How much Calcium Phosphate is there in **Emulsum Olei Morrhuæ cum Calcii Phosphate?**

A.—3.5%.

Q.—Is this dissolved before being added?

A.—No, it is not soluble.

Q.—What is done to get it incorporated?

A.—It is Precipitated Calcium Phosphate hence in the finest possible state of division and when mixed with the Syrup of Tolu is readily incorporated.

Q.—What Hypophosphites are used in the **Emulsum Olei Morrhuæ cum Hypophosphitibus?**

A.—Calcium, Potassium, and Sodium Hypophosphites.

Q.—How are these salts incorporated in the Emulsion?
A.—They are dissolved in some of the diluting water, then mixed with the Syrup and added after the primary emulsion is formed.

Q.—What is this Emulsion therapeutically, and the dose?
A.—Nutritive and tonic; dose 8 mils or 2 fluidrachms.

Q.—Which of the N. F. emulsions is made in a flask?
A.—**Emulsion of Cod Liver Oil with Malt.**

Q.—What is the emulsifying agent used?
A.—Tragacanth.

Q.—How much Oil is used?
A.—30%.

Q.—How much tragacanth is used?
A.—0.3%.

Q.—How much water is used to make the emulsion?
A.—15%.

Q.—What is the proportion of Water and Tragacanth used?
A.—1 part of tragacanth and 50 parts of water.

Q.—How is this Emulsion put together?
A.—The oil and tragacanth are well shaken in a dry bottle, then all the water is added and shaken again until the emulsion forms, then add the extract of malt in divided portions shaking well after each addition.

Q.—What possible advantage might this Emulsion have over the other Cod Liver Oil emulsions?
A.—This because of the extract of malt tends to aid digestion.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—What form of Wild Cherry is used in **Emulsum Olei Morrhuæ cum Pruno Virginiana?**
A.—The Fluidextract of Wild Cherry.

Q.—How much is there in the preparation?
A.—6.5%.

Q.—What therapeutic effect would this have in the Emulsion?
A.—Sedative expectorant.

Q.—How is the Fluidextract incorporated in the Emulsion?
A.—It is mixed with the syrup and water and added the last thing.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—What form of Egg is used in **Emulsion of Cod Liver with Egg?**
A.—Glycerite of Egg Yolk which is used as the emulsifying agent.

Q.—How much of the Glycerite is used?
A.—17.5%.

Q.—Is there any other emulsifying agent used?
A.—No.

Q.—How is this emulsion put together?
A.—The Glycerite is first placed in the mortar and to this the Oil is added a little at a time and each addition well triturated to emulsify it before the next portion is added. Next the Syrup is added in the same manner, then the flavoring and finally the water.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

Q.—Has this Emulsion any advantage over the others?
A.—Probably not, it forms a type emulsion with Glycerite of Egg Yolk as an emulsifying agent.

Q.—What is the English name for **Emulsum Olei Ricini?**
A.—Emulsion of Castor Oil.

Q.—How much Castor Oil in it?
A.—35%.

Q.—What is it flavored with?
A.—Tinct. Vanilla.

Q.—What is it therapeutically; and the dose?
A.—Laxative; dose 45 mils or 1½ fluidounces.

Q.—What is the object of this preparation?
A.—To exhibit the Castor Oil in a more palatable form.

Q.—What is there in **Emulsum Petrolati?**
A.—22.5% each of Petrolatum and Expressed Oil of Almond, Acacia 12.5%, Syrup 10%, Tinct. Lemon Peel 1.5%.

Q.—How is it put together?
A.—Melt the petrolatum and mix in a dry, warm mortar with the oil, add the acacia and triturate well, then add twice as much warm water as acacia and form the primary emulsion by rapid trituration. Add the other ingredients in the usual manner.

Q.—What is this Emulsion therapeutically?
A.—Laxative.

Q.—Is the Petrolatum absorbed?
A.—No, it acts mechanically as a lubricant.

Q.—What is the dose?
A.—15 mils or 4 fluidrachms.

INORGANIC PHARMACY

Q.—Define Inorganic Pharmacy?
A.—It is the pharmacy of the substances yielded by the mineral kingdom.

Q.—What would be included in the pharmacy of these substances?
A.—The official definition, purity rubric, physical properties, as solubility, melting point, boiling point, specific gravity, taste, color, odor, origin and purification, together with antidotal treatment if the substances are poisonous, pharmaceutical and medicinal uses.

Q.—Name two official gases.
A.—Oxygen and Nitrogen Monoxide.

Q.—What is the Latin title for **Oxygen?**
A.—Oxygenium.

Q.—How pure must it be?
A.—Must contain not less than 95% by volume of Oxygen.

Q.—How is it usually found in the market?
A.—Compressed in metallic tubes.

Q.—What is its solubility?
A.—One volume dissolves in 34 volumes of water or in 3.6 volumes of alcohol.

Q.—What impurities may be found in it?
A.—Carbon dioxide, halogens, acids, and bases.

Q.—How is it tested for Carbon Dioxide?
A.—By passing it through Barium Hydroxide T. S. when it should cause no precipitate, that is Barium Carbonate.

Q.—How is it produced commercially?
A.—Generally by the fractional distillation of liquid air. May be made from potassium chlorate and manganese dioxide and by decomposing sodium peroxide with water. Decomposition of Barium Dioxide with heat.

Q.—What is it used for medicinally?
A.—Used to support life when the lungs refuse to absorb air. Used when an anesthetic is given.

Q.—What is the chemical formula for **Nitrogen Monoxide?**
A.—N_2O.

Q.—How is it prepared?
A.—By heating Ammonium Nitrate. $NH_4NO_3 + \text{heat} = N_2O + 2\ H_2O$.

Q.—What is the synonym?
A.—Nitrous Oxide.

Q.—What is the common name?
A.—Laughing gas.

Q.—How is it handled in the market?
A.—Compressed in metallic cylinders.

Q.—How is the gas purified?
A.—By passing it through a solution of potassium hydroxide and ferrous sulphate.

Q.—What impurities does the U. S. P. give tests for?
A.—Carbon dioxide, halogens and reducing substances.

Q.—Is it soluble in water?
A.—Yes. 1:1.3 at 25° C.

Q.—What is it used for?
A.—It is used as an anesthetic in very minor operations.

Q.—Is it ever used in major operations?
A.—Not alone, it is however sometimes administered until the patient loses consciousness, then ether is given.

Q.—How is the gas administered?
A.—The patient inhales it.

Q.—How is its taste described?
A.—Sweetish.

Q.—Does it support combustion?
A.—Yes, of some substances.

Q.—What compounds of Hydrogen and Oxygen are official?
A.—Water and Solution of Hydrogen Dioxide.

Q.—Name the three official forms of Water.
A.—Water, Distilled Water, and Sterile Distilled Water.

Q.—Give the Latin name for these.
A.—Aqua, Aqua Destillata, and Aqua Destillata Sterilisata

Q.—How is Aqua defined?
A.—There is no definition given for it but quite an extended description and tests for impurities are given.

Q.—What percentage of Solids may official Water contain?
A.—0.03%.

Q.—Are these solids, inorganic or organic?
A.—Inorganic.

Q.—What inorganic impurities must be absent?
A.—Lead, copper and iron, and ammonium.

Q.—What halogen must be absent?
A.—Chloride.

Q.—What other acid radicles must be absent?
A.—Nitrites and nitrates.

Q.—Why are nitrates and nitrites tested for?
A.—They generally mean decomposed organic matter.

Q.—Should the official Water be used in making U. S. P. and N. F. preparations and filling prescriptions?
A.—No.

Q.—Why not?
A.—Because the amount of inorganic matter present is quite sufficient to decompose many delicate chemical substances, although it does not unfit it for drinking purposes.

THE ACIDS

Q.—Define an Acid.

A.—A compound in which replaceable Hydrogen is linked to an electro-negative radicle.

Q.—Are acids solid, liquid or gaseous?

A.—Acids exist in each of these states of aggregation.

Q.—Are acids organic or inorganic?

A.—They are both organic and inorganic but we will discuss those of inorganic origin at this time.

Q.—Name the general characteristics of the acids.

A.—They are sour or corrosive, they change the color of litmus to red.

Q.—Into what two classes may the inorganic acids be divided?

A.—Into hydra acids and oxy acids.

Q.—Name a gaseous acid.

A.—Hydrochloric acid.

Q.—Name a liquid acid.

A.—Sulphuric acid.

Q.—Name a solid acid.

A.—Boric acid.

Q.—What is meant by an acid marked "C. P."?

A.—Chemically pure, that is, contains no elements or compounds other than those indicated by the name.

Q.—What is meant by an acid marked "U. S. P."?

A.—That it meets all the requirements of the United States pharmacopœia.

Q.—Are the acids usually made by the pharmacist?

A.—No, for small quantities can not be made economically hence they are made in enormous quantities by large manufacturing plants.

Q.—Do these manufacturers make any acid beside the C. P. or U. S. P.?

A.—Yes, for in many industries an absolutely pure acid is not needed.

Q.—Do they ever make acids stronger than U. S. P.?

A.—Yes, as a measure of economy. The acids are made of highest concentration then diluted when used, in this way payment for transportation of water is avoided.

Q.—Are all the official acids of uniform strength?

A.—No, they vary all the way from 32% for hydrochloric acid to 94% for sulphuric acid.

Q.—Is the strength of the official dilute acids uniform?

A.—Yes, so far as the dilute inorganic acids are concerned, they are all 10%.

Q.—Is this percentage strength based on weight or volume?

A.—On weight always.

Q.—How does the U. S. P. direct that the strength of the acids be found?

A.—By titration with normal solution of potassium hydroxide.

Q.—What indicator is used to show neutralization in these titrations?

A.—Generally methyl orange.

Q.—Are the inorganic acids poisonous?

A.—Yes.

Q.—What is the antidote for such poisoning?

A.—A mild alkali should be administered, such as magnesium oxide to neutralize the acid.

Q.—Should the antidote be mixed with water?

A.—Yes, except in the case of sulphuric acid for here the heat developed by reaction between the sulphuric acid and water would be as bad as the acid itself.

Q.—Is there any objection to the use of sodium bicarbonate as an antidote?

A.—This may be used, but the large volumes of carbon dioxide which will result might rupture the eroded walls of the stomach or strangle the patient.

Q.—What is meant by Hydra acids?

A.—Those containing no oxygen.

Q.—Name the official Hydra acids.

A.—Acidum hydriodicum, dilutum, hydrobromicum dilutum, hydrochloricum, and hydrochloricum dilutum.

Q.—Give the official definition for **Acidum Hydrochloricum.**

A.—An aqueous solution containing not less than 31% nor more than 33% of HCl. Preserve it in glass-stoppered bottles.

Q.—What is its specific gravity?

A.—1.155.

Q.—How is this acid made?

A.—Usually by decomposing sodium chloride with sulphuric acid, then distilling the mixture. $2\ NaCl + H_2SO_4 = 2\ HCl + Na_2SO_4$.

Q.—What are the common names for this acid?

A.—Muriatic acid and spirit of salt, marine acid.

Q.—To what sort of acid is the name Muriatic usually applied?

A.—To an impure, yellowish hydrochloric acid.

Q.—What causes the yellow color?

A.—Said to be due to impurities of iron or organic matter.

Q.—What is the cause of the white fumes which appear at times when a bottle of hydrochloric acid is open?

A.—Formation of ammonium chloride with ammonia present in the air. This is particularly noticeable if the bottle is near a bottle of ammonia water.

Q.—What happens when hydrochloric acid is mixed with manganese dioxide and heated?

A.—Chlorine is given off.

Q.—Is hydrochloric acid given internally?

A.—Not the stronger acid, the U. S. P. gives no dose.

Q.—Define **Acidum Hydrochloricum Dilutum.**

A.—An aqueous solution containing not less than 9.5% nor more than 10.5% of HCl.

Q.—How is it prepared?

A.—By mixing 100 Gm. of hydrochloric acid with 220 Gm. of distilled water.

Q.—What is its specific gravity?

A.—1.049.

Q.—How would you test for the presence of free chlorine or bromine in this acid?

A.—Add to a few mils of the acid, a few drops of potassium iodide T. S. and a few drops of chloroform then shake well. The

chloroform should not show any color; if it does free chlorine or bromine is present.

Q.—What is it therapeutically?
A.—Used in cases of indigestion; tonic and refrigerant.

Q.—How should it be administered?
A.—Drawn through a glass tube because the acid is likely to attack the enamel of the teeth. Dose 15 minims.

Q.—Define **Acidum Hydrobromicum Dilutum.**
A.—An aqueous solution containing not less than 9.5% nor more than 10.5% of HBr. Preserve it in amber-colored, glass-stoppered bottles, protected from the light.

Q.—What is its specific gravity?
A.—1.076.

Q.—How is the acid made?
A.—May be made by two processes. Reaction between potassium bromide and sulphuric acid, then distillation of the hydrobromic acid. Or by double decomposition and precipitation using potassium bromide and tartaric acid. In this latter case the hydrobromic acid is in solution and potassium bitartrate is precipitated.

Q.—What name is given to this precipitation process?
A.—The Fothergill process.

Q.—Which is the better process?
A.—The distillation process yields a purer acid. The precipitation process is more convenient.

Q.—Is this acid stable?
A.—No, hence only quantities should be made that will be used in a short time.

Q.—What is it therapeutically?
A.—Sedative.

Q.—What is the dose?
A.—1 mil or 15 minims.

Q.—Define **Acidum Hydriodicum Dilutum.**
A.—An aqueous solution containing not less than 9.5% nor more than 10.5% of HI. Preserve it in amber-colored bottles with glass stoppers, protected from the light and do not dispense it if it contains free iodine.

Q.—What process is used in making this acid?
A.—The Fothergill process.

Q.—What is used in making it?
A.—Potassium iodide, potassium hypophosphite, tartaric acid, diluted alcohol and distilled water.

Q.—How is it made?
A.—The two potassium salts are dissolved in water. The tartaric acid is dissolved in diluted alcohol and mixed with the first solution. The mixture is allowed to stand where it is cold for a time, then filtered, the crystalline precipitate is washed with diluted alcohol. The alcohol is then evaporated.

Q.—Why is potassium iodide used?
A.—To furnish the iodide radicle for the HI.

Q.—Would sodium iodide or lithium iodide do as well?
A.—No, for neither of these would form a precipitate.

Q.—What precipitate does form?
A.—Potassium bitartrate.

Q.—Why is it necessary to form this precipitate?
A.—So that the solution of HI can be separated from the by-product.

Q.—Why is potassium hypophosphite used?
A.—In the process of manufacture it is made to form dilute hypophosphorous acid and this protects the hydriodic acid from decomposition by oxidation.

Q.—Why is tartaric acid used?
A.—To break up the potassium salts and furnish the H for the HI.

Q.—Would any other acid do as well?
A.—No, for no other acid would form an insoluble compound with the potassium salts.

Q.—Is the tartaric acid soluble in water?
A.—Yes.

Q.—Then why is it dissolved in diluted alcohol?
A.—The by-product potassium bitartrate is less soluble in alcohol than in water, so alcohol is used to prevent as far as possible the introduction of water.

Q.—Then why are the potassium salts not dissolved in diluted alcohol?

A.—Because they are not soluble in alcohol.

Q.—Why is the mixture kept cold during the reaction?

A.—Because the colder the liquid is, the less will the potassium bitartrate dissolve.

Q.—Why is the precipitate washed with diluted alcohol?

A.—The HI will dissolve in the alcohol but the potassium bitartrate will not.

Q.—Why is the alcohol evaporated?

A.—Because it is not wanted in the finished product.

Q.—Why is this acid not made by reaction between potassium iodide and sulphuric acid?

A.—Because the HI formed immediately reacts with the H_2SO_4 and both are decomposed.

Q.—How is the acid tested for free iodine?

A.—The addition of a few drops of starch T. S. to 5 mils of the acid will give a dark blue color if free iodine is present.

Q.—What is it therapeutically?

A.—Alterative.

Q.—What is the dose?

A.—0.5 mil or 8 minims.

Q.—Into what official preparation does it enter?

A.—Syrup of Hydriodic Acid.

THE OXY ACIDS

Q.—What are Oxy acids?

A.—Those acids which contain oxygen.

Q.—When there are two acids of the same element containing different quantities of oxygen, how are they named?

A.—The acid containing less oxygen has the suffix "ous" and the one containing more oxgen has the suffix "ic".

Q.—Give examples of the above.

A.—H_2SO_3 is sulphurous acid and H_2SO_4 is sulphuric, HNO_2 is nitrous acid and HNO_3 is nitric acid.

Q.—How are the salts named which are derived from the oxy acids?

A.—Acids ending in "ous" produce salts ending in "ite" while acids ending in "ic" produce salts ending in "ate".

Q.—Give an example of this.

A.—Sulphur**ous** acid produces sulph**ites**, as sodium sulphite and potassium sulphite. Sulphur**ic** acid produces sulph**ates**, as sodium sulphate and ferrous sulphate. Nitr**ous** acid produces nitr**ites**, while nitr**ic** acid produces nitr**ates**.

Q.—Give the Latin title for **Nitric Acid.**

A.—Acidum Nitricum.

Q.—Give its chemical formula.

A.—HNO_3.

Q.—Give the official definition.

A.—An aqueous solution containing not less than 67% nor more than 69% of HNO_3. Preserve it in dark amber-colored bottles and protect it from the light.

Q.—What is its common name?

A.—Aqua Fortis.

Q.—How is nitric acid made?

A.—By reaction between sodium nitrate and sulphuric acid.

Q.—By what other method may it be made?

A.—By dissolving N_2O_5 in water. $N_2O_5 + H_2O = 2\ HNO_3$.

Q.—What is the specific gravity?

A.—1.403.

Q.—How does heat affect Nitric Acid?

A.—It volatilizes at 110° C.

Q.—What effect does sunlight have on Nitric Acid?

A.—It is decomposed and develops N_2O_4 giving a brownish-red color.

Q.—How does it affect animal tissue?

A.—Colors it yellow.

Q.—What use is made of it in pharmacy?

A.—Used chiefly as an oxidizing agent.

Q.—What use is made of it in medicine?

A.—It is used externally to destroy warts, internally highly diluted it is tonic and astringent.

Q.—Define **Acidum Nitrohydrochloricum.**

A.—A strong aqueous solution containing hydrochloric acid, nitric acid, nitrosyl chloride and chlorine.

Q.—What is its synonym?

A.—Nitromuriatic acid.

Q.—What is its common name?

A.—Aqua Regia.

Q.—Why is it so-called?

A.—Because of its power to dissolve gold, the king of metals.

Q.—To what element is due its power to dissolve gold?

A.—The chlorine.

Q.—How is the acid prepared?

A.—By mixing 18 volumes of nitric acid with 82 volumes of hydrochloric acid.

Q.—Show by equation what forms.

A.—$HNO_3 + 3\ HCl = NOCl + Cl_2 + 2\ H_2O$.

Q.—How should the acid be stored?

A.—In amber-colored, glass-stoppered bottles not more than half filled and in a cool place.

Q.—Why must it be protected from the light?

A.—Light tends to decompose it and re-form hydrochloric acid.

Q.—Why must it be kept cool?

A.—It loses chlorine when heated.

Q.—Why must the bottles be only half full?

A.—Gas develops for a considerable time after mixing, hence there must be room in the bottle for the accumulating gas or an explosion will occur.

Q.—What note does the U. S. P. give regarding the dispensing of this acid?

A.—It must not be dispensed unless it immediately liberates iodine when one drop of the acid is added to one mil of potassium iodide solution 1 to 5.

Q.—What is this acid therapeutically?

A.—A hepatic stimulant.

Q.—What is the dose?

A.—0.2 mil or 3 minims.

Q.—What care must be taken when dispensing this acid with many organic substances?

A.—An effervescence is likely to occur which may be due to oxidation of some of the organic matter.

Q.—Define **Acidum Nitrohydrochloricum Dilutum.**

A.—A dilute aqueous solution containing hydrochloric acid, nitric acid, nitrosyl chloride and chlorine.

Q.—What is it made from?

A.—10 volumes of nitric acid, 45.5 volumes of hydrochloric acid and 194.5 volumes of water.

Q.—What is the test that determines its fitness for dispensing?

A.—It must immediately liberate iodine when 5 drops are added to an aqueous solution of potassium iodide (1 to 5).

Q.—What is the dose?

A.—1 mil or 15 minims.

Q.—What is the chemical formula for **Acidum Phosphoricum?**

A.—H_3PO_4.

Q.—Give the official definition.

A.—A liquid containing not less than 85% nor more than 88% of H_3PO_4. Preserve it in glass-stoppered bottles.

Q.—By what other names is this acid known?

A.—Syrupy Phosphoric Acid, Orthophosphoric Acid.

Q.—How is the acid made?

A.—By oxidizing phosphorus with nitric acid. It may also be made by treating phosphorus with bromine under water. This forms PBr_5, this reacts with water to form H_3PO_4 and HBr, now the HBr is decomposed with nitric acid.

Q.—What happens when phosphoric acid is heated?

A.—At 200°C. it has lost water and forms pyrophosphoric acid, at a still higher temperature more water is driven off and metaphosphoric acid forms.

Q.—What dangerous impurity may be found in phosphoric acid?

A.—Arsenic, which comes from the sulphuric acid used in the production of phosphorus.

Q.—What is the specific gravity of this acid?

A.—1.72.

Q.—Is it given internally?
A.—No, not the stronger acid.

Q.—Define **Acidum Phosphoricum Dilutum.**
A.—An aqueous solution containing not less than 9.5% nor more than 10.5% of H_3PO_4. Preserve it in well-stoppered bottles.

Q.—How is it prepared?
A.—By mixing 100 Gm. of phosphoric acid with 765 Gm. of distilled water.

Q.—How is it tested for the presence of nitric acid?
A.—Mix equal parts of the acid and sulphuric acid, then after cooling add a clear crystal of ferrous sulphate, no brownish color should appear around the crystal, if it does it is evidence of nitric acid.

Q.—What is the acid therapeutically?
A.—Tonic and refrigerant.

Q.—What is the dose?
A.—2 mils or 30 minims.

Q.—Define **Acidum Hypophosphorosum.**
A.—An aqueous solution containing not less than 30% nor more than 32% of HPH_2O_2. Preserve it in glass-stoppered bottles.

Q.—What is its specific gravity?
A.—1.130.

Q.—How is this acid made?
A.—By decomposing barium hypophosphite with sulphuric acid or by decomposing calcium hypophosphite with oxalic acid.

Q.—Is this acid given internally?
A.—No, and the U. S. P. gives no dose for it.

Q.—Is this acid of a higher strength found in commerce?
A.—Yes, there is in the market a 50% acid.

Q.—What is the definition for **Acidum Hypophosphorosum Dilutum?**
A.—An aqueous solution containing not less than 9.5% nor more than 10.5% of HPH_2O_2. Preserve it in well stoppered bottles.

Q.—How is the acid prepared?
A.—By mixing 100 Gm. of hypophosphorous acid with 210 Gm. of distilled water.

Q.—What pharmaceutical use is made of it?
A.—Used as a reducing agent in several preparations to keep them from being oxidized by the oxygen of the air.

Q.—What is the acid therapeutically?
A.—Tonic, but it is rarely given by itself.

Q.—What is the dose?
A.—0.5 mil or 8 minims.

Q.—What is the chemical formula for **Sulphuric Acid?**
A.—H_2SO_4.

Q.—Give the official definition.
A.—A liquid containing not less than 93% nor more than 95% of H_2SO_4. Preserve it in glass-stoppered bottle.

Q.—What is the common name?
A.—Oil of vitriol.

Q.—How is it made?
A.—There are two processes, the "lead chamber" process and the "contact" process. By the lead chamber process sulphur is burned in the presence of moist air which forms H_2SO_3, then nitric acid oxidizes it to H_2SO_4. By the contact process, sulphur is burned in the air to form SO_2; this is passed over platinized asbestos which acts as a catalytic agent to take oxygen from the air to make it SO_3 and this is then dissolved in water.

Q.—Which is the better process?
A.—The contact process, this produces a purer acid at a lower price.

Q.—What is the specific gravity of the acid?
A.—1.83.

Q.—What precaution is to be made when this acid is mixed with water?
A.—The acid is always to be poured slowly and with constant stirring into the water, never the reverse.

Q.—What happens when sulphuric acid and water are mixed?
A.—Great heat is generated.

Q.—Give the official definition for **Acidum Sulphuricum Dilutum.**
A.—An aqueous solution containing not less than 9.5% nor more than 10.5% of H_2SO_4. Preserve in glass-stoppered bottles.

Q.—How is this acid made?

A.—By carefully and slowly adding 50 Gm. of sulphuric acid to 420 Gm. of distilled water.

Q.—What is it therapeutically?

A.—Astringent and used to check night sweats in tuberculosis.

Q.—What is the dose?

A.—1 mil or 15 minims.

Q.—Give the official definition for **Acidum Sulphuricum Aromaticum.**

A.—Aromatic Sulphuric Acid contains free sulphuric acid and ethyl-sulphuric acid together equivalent to not less than 19% nor more than 21% of H_2SO_2. Preserve it in glass-stoppered bottles.

Q.—What is the common name?

A.—Elixir of Vitriol.

Q.—What is it made from?

A.—Sulphuric acid 109 volumes, tincture of ginger 50 volumes, oil of cinnamon 1 volume, and alcohol to make 1000 volumes.

Q.—What causes it to turn dark after standing a while?

A.—The action of the sulphuric acid on the oil and tincture.

Q.—What is it therapeutically?

A.—Astringent and used to check night sweats of tuberculosis.

Q.—What is the dose?

A.—1 mil or 15 minims.

METALLOIDS AND THEIR PREPARATIONS

Q.—What are metalloids?

A.—The suffix "oid" means like, therefore metalloids are like metals in many ways but differ in some of their specific properties, that is they lack malleability, ductility and tenacity.

Q.—By what other name is the class known?

A.—The negative elements.

Q.—Name them.

A.—Chlorine, bromine, iodine, sulphur, phosphorus, carbon, silicon, arsenic and boron.

Q.—What class name is given to the group, chlorine, bromine, iodine and fluorine?

A.—The Halogens.

Q.—What does the word Halogen mean?
A.—Salt producers.

Q.—What is the symbol and atomic weight of **Chlorine?**
A.—Cl; 35.46.

Q.—Is it a solid, liquid or gas?
A.—A gas.

Q.—What color is it?
A.—Greenish-yellow.

Q.—Is it official?
A.—No.

Q.—How is the gas made?
A.—By heating a mixture of hydrochloric acid and manganese dioxide, or a mixture of salt, sulphuric acid and manganese dioxide. Also reaction between hydrochloric acid and potassium chlorate will give off chlorine.

Q.—What is the principal use of Chlorine?
A.—As a bleaching agent and a disinfectant.

Q.—Does chlorine act directly as a bleaching agent?
A.—No, it acts only in the presence of moisture. The chlorine decomposes water to form HCl and the oxygen which is thus released does the bleaching and disinfecting.

Q.—Name the U. S. P. preparations of Chlorine.
A.—Calx chlorinata, liq. sodæ chlorinatæ, chlorine T. S.

Q.—Name the N. F. preparations of Chlorine.
A.—Liq. chlori compositus, liq. potassæ chlorinatæ.

Q.—What use is made of Chlorine in the army and in large communities?
A.—Used to disinfect drinking water, also to keep wounds aseptic.

Q.—Which is the most active chemically, chlorine, bromine or iodine?
A.—Chlorine, it will displace either bromine or iodine from their compounds.

Q.—What is the symbol and atomic weight of **Bromine?**
A.—Br.; 79.92.

Q.—Is it official?
A.—Yes, in the N. F.

Q.—What is the Latin title?
A.—Bromum.

Q.—Give the official definition.
A.—It contains not less than 98% of Br., and not more than 2% of Cl. Preserve it in glass-stoppered bottles in a cool place, the bottle being enclosed in a larger vessel with the space between filled with some substance capable of absorbing and combining with any vapors which might escape.

Q.—Is bromine, solid, liquid or gaseous?
A.—Liquid.

Q.—What color is it?
A.—Brown.

Q.—Give the boiling point and specific gravity.
A.—Boils at 63°C., specific gravity 3.016.

Q.—What is its solubility?
A.—1 mil dissolves in 90 mils of water.

Q.—What is the source of Bromine?
A.—Obtained principally from brine from salt wells in central United States.

Q.—How is it obtained?
A.—The brine is evaporated until the chlorides and sulphates are crystallized out, then the remaining liquid is treated with chlorine. This liberates the bromine which is distilled over into condensers.

Q.—In what form does the bromine exist in the brine?
A.—Principally as magnesium bromide.

Q.—What name is applied to the concentrated brine?
A.—Bittern.

Q.—Is this the only method by which bromine is obtained?
A.—No, it is now successfully obtained from the bittern, by electrolysis.

Q.—What care must be observed in handling bromine?
A.—The liquid and its vapors are intensely irritating, suffocating and corrosive, hence it must not come in contact with the skin nor should it be inhaled.

Q.—What preparations of it are official?
A.—Bromine T. S. in the U. S. P. and Liquor Bromi in N. F.

Q.—What is the symbol and atomic weight of **Iodine?**
A.—I.; 126.92.

Q.—Give the Latin title.
A.—Iodum.

Q.—Is it official?
A.—Yes, in the U. S. P.

Q.—Give the official definition.
A.—It contains not less than 99.5% of I. Preserve it in glass-stoppered bottles in a cool place.

Q.—Is it a solid, liquid or gas?
A.—A solid.

Q.—What is its color?
A.—Bluish black.

Q.—What is its specific gravity?
A.—4.66 at 17°C.

Q.—What is its solubility?
A.—1 Gm. dissolves in 2950 mils of water.

Q.—What is the source of Iodine?
A.—Obtained from the ashes of sea weeds and from sodium iodide and iodate which is obtained from the mother liquors after crystallization of sodium nitrate in South America.

Q.—In what form is iodine present in the ashes of sea weeds?
A.—As sodium and potassium iodides.

Q.—How is the iodine obtained from them?
A.—The ashes are extracted with water. The solution is concentrated, then distilled with sulphuric acid and manganese dioxide when the iodine is liberated and collected in condensers.

Q.—How is the iodine purified?
A.—By sublimation.

Q.—What is the color of iodine vapors?
A.—Violet.

Q.—What is the color of an alcoholic solution of iodine?
A.—Brown.

Q.—What is the color of a chloroformic solution?
A.—Violet.

Q.—What is the significance of this difference in color?

A.—Some contend that a true solution should be of a violet color and that the brown color indicates that there has been a reaction to produce another compound.

Q.—What is the identity test for iodine?

A.—With Starch T. S. it gives a blue color which will disappear when heated, but reappears when the mixture cools.

Q.—What is iodine therapeutically?

A.—Antiseptic, germicide, alterative.

Q.—What is the internal dose?

A.—0.005 Gm. or $\frac{1}{12}$ gr.

Q.—Is it poisonous?

A.—Yes.

Q.—What is the antidote?

A.—Large quantities of starch paste, then an emetic.

Q.—What preparations are official?

A.—Liq. iodi compositus, tinctura and unguentum, U. S. P., phenolum iodatum, collodium, liq. iodi phenolatus, tinctura iodi fortior, tinctura iodi decolorata, N. F.

Q.—What is the symbol and atomic weight of **Phosphorus?**

A.—P.; 31.04.

Q.—Is it official?

A.—Yes, in the U. S. P.

Q.—Give the official definition.

A.—Phosphorus must be carefully preserved under water in strong, well-closed containers, in a secure and moderately cool place protected from light.

Q.—What are the two sources of Phosphorus?

A.—From bones and from phosphatic minerals.

Q.—In what form does it exist in bones?

A.—As calcium phosphate.

Q.—How is it obtained from bones?

A.—The bones are treated with sulphuric acid, charcoal and strong heat.

Q.—How is it obtained from the phosphate rock?

A.—By heating with charcoal and sand in an electric furnace. The phosphorus sublimes and the slag is drawn off at the bottom of the furnace.

Q.—How is phosphorus found in the market?

A.—In round moulded sticks.

Q.—What color is it?

A.—Yellowish.

Q.—Is it hard or soft?

A.—It is about the consistence of beeswax.

Q.—What is its specific gravity?

A.—1.83 at 10°C.

Q.—What is its melting point?

A.—44°C.

Q.—What is the best solvent for it?

A.—Carbon disulphide will dissolve it most readily but chloroform is the more desirable solvent.

Q.—What is the objection to the use of carbon disulphide?

A.—It is very volatile, inflammable and has a most disagreeable odor.

Q.—Why must phosphorus be kept under water?

A.—It unites with the oxygen of the air so rapidly that it takes fire.

Q.—What is phosphorus therapeutically?

A.—Nerve stimulant.

Q.—Do the phosphates have the same action?

A.—No.

Q.—Is phosphorus poisonous?

A.—Yes.

Q.—What is the antidote?

A.—Old oil of turpentine, or very dilute solution of potassium permanganate. Copper sulphate, which acts both as an antidote forming copper phosphide and as an emetic.

Q.—Should fats or oils be administered?

A.—No, they have a solvent action on the phosphorus and cause its more ready absorption.

Q.—What is the dose of phosphorus?
A.—0.0005 Gm. or 1-120 gr.

Q.—What preparations are official?
A.—Pills, U. S. P., elixir, liquor, phosphorated oil, elixir of phosphorus and nux vomica, N. F.

Q.—What particular use is found for phosphorated oil?
A.—Emulsion of cod liver oil with phosphorus is much prescribed and this phosphorated oil furnishes a convenient way of introducing the phosphorus.

Q.—What is the symbol and atomic weight of **Silicon**?
A.—Si.; 79.2.

Q.—Is it official?
A.—No.

Q.—What compound of Silicon is official?
A.—Terra Silicea Purificata, purified siliceous earth.

Q.—What are the synonyms for this?
A.—Purified kieselguhr, purified infusorial earth.

Q.—What compound of Silicon is this?
A.—SiO_2, silicon dioxide.

Q.—What use is made of it?
A.—Used as a filtering medium and clarifying agent.

Q.—What silicon preparation is now much used?
A.—Solution of sodium silicate.

Q.—What common names are applied to it?
A.—Water-glass and soluble glass.

Q.—What use is made of it?
A.—Used on muslin for making casts for fractured bones, used for preserving eggs, also as a mucilage or glue for fastening heavy pasteboard cartons.

Q.—What other silicates are official?
A.—Talcum Purificatum and Kaolinum.

Q.—What is the definition for Purified Talc?
A.—A purified, native, hydrous magnesium silicate sometimes containing a small amount of aluminum silicate.

Q.—How is it purified?
A.—By boiling with distilled water containing some hydrochloric acid, then washing with distilled water until the washings give no reaction with litmus.

Q.—What use is made of it?
A.—It is used as clarifying agent and filter medium. Medicinally it is used as an insoluble dusting powder.

Q.—What advantage does talc have over kieselguhr as a filtering medium?
A.—Kieselguhr seems to combine either physically or chemically with alkaloids in solution and hold them, while talc will not do this.

Q.—What is the Latin title for Kaolin?
A.—Kaolinum.

Q.—Give the official definition.
A.—A native hydrated aluminum silicate, powdered and freed from gritty particles by elutriation.

Q.—Into what official preparation does it enter?
A.—Cataplasma Kaolini.

Q.—Give the symbol and atomic weight of **Sulphur**.
A.—S.; 32.07.

Q.—Is it official?
A.—Yes.

Q.—How many forms are official?
A.—Three.

Q.—Name them.
A.—Sublimed, precipitated, and washed sulphur.

Q.—What unofficial form is found in the market?
A.—Roll sulphur or brimstone.

Q.—What is the source of Sulphur?
A.—It is found uncombined in volcanic regions, as Sicily, also immense deposits have been found in Louisiana and Texas.

Q.—How is the Sulphur first purified?
A.—By sublimation.

Q.—What is this Sulphur then called?
A.—Sublimed sulphur.

Q.—What is the common name?
A.—Flowers of sulphur.

Q.—What can you say of its solubility?
A.—Insoluble in water or alcohol. Soluble in chloroform, carbon disulphide and olive oil.

Q.—What is its melting point?
A.—115°C.

Q.—How is sulphur identified?
A.—By burning to sulphur dioxide.

Q.—Is sulphur given internally?
A.—Yes.

Q.—What is it therapeutically?
A.—Internally laxative, externally parasiticide.

Q.—What is the internal dose?
A.—4 Gm. or 1 drachm.

Q.—What preparation is official?
A.—Unguentum U. S. P., ungt. sulphuris comp., ungt. sulphuris alkalinum, petroxolinum sulphuratum. N. F.

Q.—What is the Latin title for **Washed Sulphur?**
A.—Sulphur Lotum.

Q.—How is it prepared?
A.—Sublimed sulphur is mixed with a little ammonia water and distilled water, then allowed to stand for three days. Now it is washed with distilled water until the washings do not change the color of red litmus paper.

Q.—Why is the sulphur so treated?
A.—To remove sulphur dioxide and arsenic which are often present as impurities.

Q.—Why is ammonia water used?
A.—This converts the impurities to ammonium compounds which are readily soluble in water and easily washed out of the sulphur.

Q.—What particular use is made of it?
A.—This form of sulphur is generally given internally because the sulphur dioxide present in the sublimed is likely to cause griping.

Q.—What preparations are official?

A.—Compound powder of glycyrrhiza U. S. P., troches of sulphur and potassium bitartrate N. F.

Q.—By what other names is **Sulphur Præcipitatum** known?

A.—Milk of Sulphur, lac sulphur, lac sulphuris.

Q.—What is used in making it?

A.—Sublimed sulphur, lime, hydrochloric acid, water.

Q.—How is it prepared?

A.—The lime is first slaked, then the sulphur is added and a quantity of water. This mixture is boiled for an hour, water being added from time to time to make up that lost by evaporation. It is then cooled, filtered and to the filtrate is added dilute hydrochloric acid. The sulphur precipitates and this is washed with water until the washings no longer give a precipitate upon the addition of ammonium oxalate T. S.

Q.—What kind of a container must be used?

A.—Glass or porcelain.

Q.—Why must glass or porcelain be used?

A.—The mixture would attack and combine with a metal container.

Q.—Does the heating cause a reaction between the lime and sulphur?

A.—Yes, it is said to form calcium pentasulphide, CaS_5, and calcium thiosulphate, CaS_2O_3.

Q.—Would it not be just as well to use sulphuric acid to precipitate the sulphur as hydrochloric acid?

A.—No, hydrochloric acid forms calcium chloride which is soluble and easily washed out of the sulphur, while sulphuric acid would form calcium sulphate which is insoluble and could not be washed out.

Q.—What is the test for the presence of calcium sulphate?

A.—Ignite a weighed portion of precipitated sulphur and not more than 0.3% of residue should remain; if the residue is greater it indicates calcium sulphate.

Q.—Is hydrochloric acid added to the filtrate until no further precipitation takes place?

A.—No, the solution must retain an alkaline reaction and a yellow color, hence the acid is added until just short of neutralization.

Q.—Why is it necessary that the solution be not rendered acid in reaction?

A.—The solution contains some arsenic generally which will be held in solution as long as the liquid is alkaline but when it becomes acid the arsenic is precipitated with the sulphur. Further, sulphur precipitated from acid mixture is much coarser than when precipitated from alkaline solution.

Q.—Why are the washings from precipitated sulphur tested with ammonium oxalate T. S.?

A.—To insure the washing out of all calcium salts; if any calcium is present, the insoluble calcium oxalate forms.

Q.—Why is it that precipitated sulphur always looks so much whiter than the sublimed?

A.—Because the precipitated is in a much finer state of division.

Q.—How would you test for the presence of alkali or acid?

A.—Shake a little of the sulphur with a little distilled water, filter and test the filtrate with litmus.

Q.—What preparations are official?

A.—Naphthol paste and sulphurated zinc paste, N. F.

Q.—Is **Sulphuris Iodidum** a compound or a preparation?

A.—It is probably a compound but it is of such loose combination that exposure to the air decomposes it for which reason some authorities look upon it as only a preparation. It has been called iodized sulphur.

Q.—How is it prepared?

A.—Washed sulphur and iodine are thoroughly triturated together, then heated on the water-bath until they combine, then poured on a cold porcelain surface to cool.

Q.—How must it be stored?

A.—In glass-stoppered bottles in a cool place.

Q.—Is it given internally?

A.—Evidently not as the N. F. gives no dose for same.

Q.—What use is made of it?

A.—As a stimulant and caustic in the form of ointment for skin diseases.

Q.—What is the symbol and atomic weight of **Arsenic**?

A.—As.; 74.96.

Q.—Is it official?
A.—No.

Q.—Is arsenic always looked upon as being a metalloid or non-metal?
A.—Not by all authorities, however, its non-metallic properties are more pronounced than its metallic.

Q.—How is it found in nature?
A.—Never found free but in combination as sulphides, As_2S_2 realgar and As_2S_3 orpiment, also as As_2O_3 arsenic trioxide. Also as $Fe_2As_2S_2$, mispickel.

Q.—What compounds of Arsenic are official?
A.—Arsenic iodide and arsenic trioxide.

Q.—Give the official definition for **Arsenous Iodide**.
A.—It contains when dried to constant weight over sulphuric acid, not less than 99% of AsI_3. Preserve it in amber-colored, glass-stoppered vials, in a cool place protected from light.

Q.—What is the solubility of Arsenous Iodide?
A.—One Gm. dissolves in 12 mils of water, also in alcohol, chloroform, ether and carbon disulphide.

Q.—How is it made?
A.—May be made by reaction between the two elements, or reaction between arsenic trioxide and iodine.

Q.—What effect does water have on it?
A.—After standing for a time it forms arsenous acid and hydriodic acid.

Q.—What is it therapeutically?
A.—Alterative.

Q.—What is the dose?
A.—0.005 Gm. or 1/12 gr.

Q.—What preparation is official?
A.—Liq. arseni et hydrargyri iodidi.

Q.—What are the synonyms for **Arseni Trioxidum?**
A.—Arsenous acid, arsenous oxide, white arsenic.

Q.—What is the official definition?
A.—It contains when dried to a constant weight at 100°C., not less than 99.8% of As_2O_3.

Q.—What two varieties are found in the market?
A.—Amorphous or glassy and the crystalline, white porcelain-like.

Q.—Which is the more soluble?
A.—The amorphous.

Q.—What effect does exposure to the air have on the glassy or amorphous kind?
A.—Changes it to the opaque crystalline.

Q.—How is the trioxide prepared?
A.—Usually by roasting the ores when the trioxide sublimes, then it is purified by re-sublimation.

Q.—Why is it a mistake to call it arsenous acid?
A.—Because it is a true oxide and does not form an acid until in contact with water.

Q.—Show the equation for the formation of the acid.
A.—$As_2O_3 + 3\ H_2O = 2\ H_3AsO_3$.

Q.—What is it therapeutically?
A.—Alterative, externally escharotic.

Q.—What is the dose?
A.—0.002 Gm. or 1-30 gr.

Q.—Is it poisonous?
A.—Yes.

Q.—What is the antidote?
A.—The official antidote is Ferric Hydroxide with Magnesium Oxide.

Q.—How does this act as an antidote?
A.—The iron combines with the arsenic forming an insoluble ferric arsenite which must then be removed from the stomach by an emetic.

Q.—How may Ferric Hydroxide be quickly prepared?
A.—By diluting a little tincture of ferric chloride and pouring it into ammonia water. Be sure that there is a slight excess of ammonia water so all the iron will be precipitated.

Q.—Is it absolutely necessary that the precipitate be washed?
A.—No, for it is of the utmost importance that the iron be administered as quickly as possible.

Q.—May this antidote be used for poisoning by Paris Green?
A.—Yes.

Q.—What tests are used to identify Arsenic?
A.—Marsh's, Fleitmann's, Gutzeit's and Reinsch's.

Q.—In a general way what is Marsh's test?
A.—Hydrochloric acid, zinc and the solution to be tested are mixed in a flask, the acid and zinc generate hydrogen which combines with the arsenic to form arsine, AsH_3, this is burned and deposits in the form of a mirror on a cold porcelain surface.

Q.—What is one objection to this test?
A.—It gives a test for antimony as well as arsenic.

Q.—How can antimony be told from arsenic in this test?
A.—The mirror deposited by arsenic is quite black while that deposited by antimony is brownish-black. The arsenic mirror is soluble in Labarraque's Solution while the antimony spot is not.

Q.—What is Gutzeit's test?
A.—It is a modification of Marsh's test.

Q.—Describe it.
A.—Zinc and sulphuric acid are mixed in a test tube to generate hydrogen, and then the solution to be tested is added; this forms arsine which in turn blackens a filter paper moistened with silver nitrate solution, tied over the top of the test tube.

Q.—Does this respond when antimony is present?
A.—Yes.

Q.—Why is the Fleitman test preferable?
A.—Because antimony does not give a reaction.

Q.—What is the particular difference in Fleitman's test?
A.—Hydrogen is formed by the reaction of alkali on zinc instead of acid and antimony will not react even if present. A filter paper moistened with silver nitrate is tied over the open end of the test tube in the same manner as above described.

Q.—What is Bettendorff's test?
A.—This is used especially for testing bismuth and other compounds containing antimony for the presence of arsenic.

Q.—How is it carried out?
A.—The solution to be tested is mixed with hydrochloric acid in a test tube, to this is added stannous chloride solution, which causes a brownish tint or precipitate if arsenic is present.

Q.—What is Reinsch's test?

A.—A piece of bright metallic copper is placed in the suspected solution. If arsenic is present an electrolytic action is set up which causes the arsenic to deposit on the copper thus producing a black stain.

Q.—What chemicals interfere with Gutzeit's test?

A.—Antimony produces a gray stain. Sulphites, sulphides, thiosulphates and any compounds which will liberate hydrogen sulphide or sulphurous acid when treated with sulphuric acid.

Q.—What is to be done in case these are present?

A.—They are oxidized with nitric acid then reduced with sulphurous acid.

Q.—What chemicals interfere in Bettendorff's test?

A.—Nitrates, sulphates, sulphites, sulphides and compounds of mercury, gold and selenium.

Q.—What preparations of Arsenic Trioxide are official?

A.—Liq. acidi arsenosi, liq. potassii arsenitis, U. S. P., liq. arsenicalis, Clemen's liq. auri et arseni bromidi, pil. ferri, quininæ, strychninæ et arseni fortiores, pil. ferri, quininæ, strychninæ et arseni mitis.

Q.—What is the symbol and atomic weight of **Boron?**

A.—B.; 11.

Q.—Is it official?

A.—No.

Q.—What are its two principal compounds?

A.—Boric acid, H_3BO_3 and sodium borate, $Na_2B_4O_7$.

Q.—What is the source of Boric Acid?

A.—Formerly found in the volcanic regions of Tuscany but now is made from borax which is found in immense quantities in California and other western states.

Q.—How is boric acid made from borax?

A.—By decomposing the borax in solution with hydrochloric acid. $Na_2B_4O_7 \cdot 10\ H_2O + 2\ HCl = 2\ NaCl + 4\ H_3BO_3 + 5\ H_2O$.

Q.—What can you say of the solubility of boric acid?

A.—1 Gm. dissolves in 18 mils of water, 18 mils of alcohol, 4 mils of glycerin.

Q.—What is it therapeutically?

A.—Antiseptic.

Q.—What U. S. P. preparations are official?
A.—Glyceritum boroglycerini, ungt. acidi borici.

Q.—What is the synonym?
A.—Boracic acid.

Q.—What is the dose?
A.—0.5 Gm. or 8 grains.

Q.—What is formed by heating boric acid to 100°C.?
A.—Metaboric acid.

Q.—What is the symbol and atomic weight of **Carbon?**
A.—C.; 12.

Q.—Is it official?
A.—Yes, but not by that name.

Q.—In what forms is it found in nature?
A.—As charcoal, diamonds, and graphite.

Q.—Which of these is official?
A.—Charcoal.

Q.—What is the Latin title?
A.—Carbo ligni.

Q.—What is the English title?
A.—Wood charcoal.

Q.—What is the official definition?
A.—Charcoal prepared from soft wood, and very finely powdered. Preserve it in well-closed vessels.

Q.—What kind of wood is the best charcoal said to come from?
A.—Willow.

Q.—Why must it be preserved in well-closed containers?
A.—Because it readily absorbs odors and moisture.

Q.—What is it therapeutically?
A.—Absorbent.

Q.—What is the dose?
A.—1 Gm. or 15 grains.

Q.—What can you say of its solubility?
A.—It is insoluble.

Q.—What oxygen compound of carbon is common?
A.—Carbon dioxide.

Q.—Where is this most commonly found in the drug store?
A.—In soda water.

Q.—Is carbon dioxide readily soluble?
A.—Not very, but much more can be dissolved in a given quantity of water with cold and pressure.

Q.—Is carbon dioxide a supporter of combustion?
A.—No, and in this connection it can be used to advantage as a fire extinguisher.

Q.—What two good solvents are compounds of Carbon?
A.—Carbon disulphide and carbon tetrachloride.

Q.—What two carbon acids are there?
A.—Carbonic acid and hydrocyanic acid.

Q.—What two advertised grease removers are said to be chiefly carbon tetrachloride?
A.—Carbona and karith.

THE ALKALI METALS

Q.—What elements are included in the group known as the Alkali Metals?
A.—Sodium, potassium, lithium, and ammonium.

Q.—Is ammonium an element?
A.—No, it is a radical.

Q.—Why is it called an alkali metal?
A.—Because its physical and chemical properties so much resemble those of this group.

Q.—What are these properties?
A.—They all combine with acids to form salts. They turn litmus blue. They have a soapy, caustic taste in solution. With water they form bases. They all have a valence of one. Almost all their salts are readily soluble in water.

Q.—What other elements are classed in this same group chemically?
A.—Caesium and rubidium.

Q.—Why are these not treated with the group pharmaceutically?
A.—Because neither the elements nor their salts are used in medicine or pharmacy.

Q.—By what other name is this group known?

A.—The light metals because they all have a specific gravity of less than 1, hence float on water.

Q.—How can the metal be obtained from its compounds?

A.—By strongly heating the carbonates with charcoal, when carbon monoxide is formed and rejected and the vapors of the metal are condensed. The metal is now largely obtained by subjecting the hydroxide to the action of a strong electric current.

Q.—How must the metals be stored?

A.—Under some liquid which contains no oxygen for they readily combine with oxygen, hence kerosene is commonly used.

AMMONIUM

Q.—What is the ammonium radical?

A.—NH_4 molecular weight 18.04.

Q.—What is NH_3?

A.—This is ammonia gas.

Q.—What is the source of ammonia?

A.—It is usually obtained as a by-product in the manufacture of illuminating gas from the destructive distillation of coal.

Q.—Is this the only source?

A.—No, large quantities are now made by the direct union of the nitrogen of the atmosphere with hydrogen.

Q.—What ammonium salt is largely used by manufacturers in making most of the official ammonium compounds?

A.—Ammonium sulphate, which is made by conducting the ammonia from the gas-liquor into iron vessels containing sulphuric acid, when completely saturated it forms ammonium sulphate which is now obtained by evaporation.

Q.—How are ammonium salts usually identified?

A.—When heated with sodium, potassium or calcium hydroxide they will give off the odor of ammonia, and a piece of red litmus paper will be colored blue by the fumes.

Q.—What can you say of the solubility of the ammonium salts?

A.—They are all soluble in ten parts of water or less.

Q.—What is the purity rubric for **Ammonium Benzoate?**

A.—It must be at least 98% pure.

Q.—What is the Latin title?
A.—Ammonii benzoas.

Q.—When it is strongly heated, what happens?
A.—It is decomposed into ammonia and benzoic acid.

Q.—How is the salt made?
A.—By dissolving benzoic acid in diluted ammonia water, then evaporating at a gentle heat, adding a little ammonia water from time to time to insure an alkaline reaction at all times.

Q.—Why is it necessary to have the solution alkaline?
A.—To avoid the formation of the acid salt which is less soluble than the normal official compound.

Q.—What is it therapeutically, and dose?
A.—Diuretic, dose 1 Gm. or 15 grains.

Q.—What happens when the salt is exposed to the air?
A.—It tends to lose ammonia and become less soluble.

Q.—What is the chemical formula?
A.—$NH_4C_7H_5O_2$ or $C_6H_5COONH_4$.

Q.—What is the Latin title for **Ammonium Bromide?**
A.—Ammonii Bromidum.

Q.—What is the purity rubric?
A.—Must be 98.5% pure.

Q.—How is it made?
A.—May be made by reaction between solutions of ammonium sulphate and potassium bromide, then dissolving out the ammonium bromide with alcohol. Or by reaction between ammonia water and a solution of ferrous bromide.

Q.—What effect does exposure to air have on it?
A.—It absorbs moisture.

Q.—How does strongly heating affect it?
A.—It is volatilized without fusing.

Q.—What is it therapeutically?
A.—Sedative, dose 1 Gm., or 15 gr.

Q.—Why do some physicians prefer this bromide?
A.—It is said not to produce bromism.

Q.—What is bromism?

A.—A condition caused by long-continued use of bromides characterized by acne, anemia, loss of memory and melancholia.

Q.—Give the official definition for **Ammonii Carbonas.**

A.—It consists of varying proportions of a mixture of acid ammonium carbonate and ammonium carbamate and yields not less than 30% nor more than 32% of NH_3. Preserve it in well-closed containers and in a cool place. For medicinal purposes use only the translucent portions.

Q.—What represents the chemical formula of this official compound?

A.—$NH_4HCO_3 \cdot NH_4NH_2CO_2$.

Q.—How is this salt made?

A.—By subliming ammonium sulphate and chalk.

Q.—What happens when it is exposed to the air?

A.—It loses ammonia and carbon dioxide.

Q.—If ammonium carbamate is dissolved in water, what salt is formed?

A.—Ammonium carbonate.

Q.—If the official ammonium carbonate is dissolved in diluted ammonia water, what forms?

A.—Ammonium carbonate.

Q.—What effect does hot water have on this salt?

A.—Decomposes it into ammonia and carbon dioxide.

Q.—By what common name is it called?

A.—Baking ammonia. It is also called hartshorn in some localities, although this name is more often applied to ammonia water.

Q.—What is it therapeutically?

A.—A stimulant expectorant, dose 0.3 Gm. or 5 gr.

Q.—By what other name is **Ammonii Chloridum** called?

A.—Muriate of ammonium.

Q.—What is the crude ammonium chloride called?

A.—Sal ammoniac.

Q.—How is it prepared?

A.—The ammoniacal liquid from the gas-works is run into a solution of hydrochloric acid until neutralized. This is evaporated to dryness and the crystallized mass then is sublimed.

Q.—What are the yellow stains so frequently seen on lumps of sal ammoniac?

A.—An impurity of iron from the vessels in which it was sublimed.

Q.—How is it purified?

A.—Dissolved in water, then ammonia water is added to convert the iron to ferric hydroxide. The mixture is filtered, the ferric hydroxide is filtered out and the filtrate evaporated to dryness.

Q.—How pure must it be?

A.—99.5%.

Q.—What effect does exposure to the air have on it?

A.—Takes up some moisture.

Q.—What effect does strong heat have on it?

A.—It volatilizes without fusing.

Q.—What is it therapeutically?

A.—A stimulating expectorant; dose 0.3 Gm. or 5 gr.

Q.—What preparations are official?

A.—Trochisci Ammonii Chloridi, U. S. and Mistura Ammonii Chloridi, N. F.

Q.—How must **Ammonium Iodide** be preserved?

A.—In small well-closed containers, protected from the light.

Q.—What effect does light and air have on it?

A.—It takes up moisture, loses ammonia and liberates iodine.

Q.—How is it made?

A.—Reaction between a solution of potassium iodide and ammonium sulphate. The temperature is then reduced by the aid of ice-water. The mixture is extracted with dilute alcohol which dissolves the ammonium iodide and leaves the potassium sulphate. The solution of ammonium iodide is rapidly evaporated.

Q.—What is it therapeutically, and dose?

A.—Alterative; dose 0.3 Gm. or 5 gr.

Q.—When it has liberated iodine and become brown, how may it be restored?

A.—By the use of ammonium sulphide; then evaporate and recrystallize.

Q.—What is it therapeutically?

A.—Alterative; dose 0.3 Gm. or 5 gr.

Q.—What care must be observed in dispensing it?

A.—It is not to be dispensed if it is yellowish, as this indicates free iodine.

Q.—Is **Ammonium Hydroxide** a definite compound?

A.—It is looked upon as such by some authorities, by others it is considered only a solution of ammonia gas in water.

Q.—Where are the Ammonium Hydroxides discussed?

A.—Under Aquae as ammonia water and stronger ammonia water.

Q.—Does it in any case act like other Hydroxides?

A.—Yes, as may be seen in the making of many of the official salts of ammonium, which are made by neutralizing ammonia water with an acid.

Q.—Give the definition and purity rubric for **Ammonii Salicylas.**

A.—It contains when dried for 24 hours in a desiccator over sulphuric acid not less than 98% of ammonium salicylate. Preserve it in well-closed containers; protect from heat and light.

Q.—How is it made?

A.—Ammonia water is nearly neutralized with salicylic acid, the solution is evaporated and the salt crystallizes out. It may then be purified by recrystallization.

Q.—How does exposure to air affect it?

A.—Has no effect on it, as it is permanent in air.

Q.—What is it therapeutically?

A.—Antirheumatic, dose 0.5 Gm. or 8 gr.

Q.—What is the synonym for **Ammonii Valeras?**

A.—Ammonium valerianate.

Q.—How is the compound made?

A.—By passing dry ammonia gas into monohydrated valeric acid until neutral, then set aside for crystallization to take place.

Q.—Will the valeric acid commonly found in the market yield a satisfactory ammonium valerate?

A.—No, that is usually trihydrated, and monohydrated is the one which should be used.

Q.—Give the official definition.
A.—A compound of ammonia and valeric acid having a somewhat varying composition. Preserve it in well-closed containers.

Q.—How does exposure to the air affect it?
A.—It is deliquescent.

Q.—What is the condition of the salt usually found in the market?
A.—It is usually acid and smells strongly of the free acid.

Q.—How should this condition be remedied?
A.—This excess of acid should be neutralized with ammonia water.

Q.—What preparation is official?
A.—Elixir of Ammonium Valerate.

Q.—What is it therapeutically?
A.—Nervine, dose 0.5 Gm., or 8 gr.

Q.—What two official Ammonium salts are in the N. F.?
A.—The phosphate and hypophosphite.

Q.—What is the purity rubric for **Ammonii Hypophosphis**?
A.—It contains when dried to constant weight at 100°C, not less than 97.5% of ammonium hypophosphite.

Q.—How is it made?
A.—By neutralizing ammonia water with hypophosphorous acid, then evaporating and obtaining the salt by crystallization.

Q.—What effect does exposure to the air have on it?
A.—It is deliquescent.

Q.—What is it therapeutically?
A.—Alterative and expectorant; dose 0.2 Gm. or 3 gr.

Q.—What preparation is official?
A.—Syrup of Ammonium Hypohosphite.

Q.—Give the definition for **Ammonii Phosphas.**
A.—It contains diammonium hydrogen phosphate and ammonium dihydrogen phosphate corresponding to not less than 20% of combined ammonia. Preserve it in well-closed containers in a cool place.

Q.—How is it made?

A.—An excess of ammonia water is added to phosphoric acid, the mixture is evaporated and the salt obtained by crystallization.

Q.—How does exposure to the air affect it?

A.—It loses ammonia.

Q.—What is it therapeutically, and dose?

A.—Diuretic; dose 0.3 Gm., or 5 grs.

Q.—Into what preparation does it enter?

A.—Liq. phosphatum compositus.

Q.—Which is the most soluble of the Ammonium salts?

A.—Ammonium valerate, 1 Gm. dissolves in 0.3 mil of water.

Q.—Which is the least soluble of the Ammonium salts?

A.—Ammonium benzoate, 1 Gm. dissolves in 10 mils of water.

POTASSIUM SALTS

Q.—What is the symbol and atomic weight of Potassium?

A.—K.; 39.10.

Q.—Why is K the symbol?

A.—It is derived from Kalium, the Latin name of the element.

Q.—What is the source of Potassium to be used in making the various salts?

A.—It is obtained from the impure chloride found in mines; from suint, which is the name given to the washings from sheep's wool; from the treatment of beet-sugar residues which yield potassium carbonate. Of late some has been obtained from lakes in northern Nebraska.

Q.—How is the metal obtained from its salt?

A.—May be obtained by heating potassium carbonate with charcoal, this forms carbon monoxide and releases potassium. It is now largely produced by electrolysis of the hydroxide.

Q.—How does the metal act when exposed to the air?

A.—It oxidizes very rapidly, and burns.

Q.—How is the metal kept?

A.—In a liquid which contains no oxygen, as petroleum benzin.

Q.—What happens when the metal is placed in water?

A.—Being lighter than water it floats, decomposes the water forming potassium hydroxide, releases hydrogen, the reaction

being so energetic that the hydrogen burns with a lavender flame.

Q.—What tests are used to identify potassium in combination?

A.—The most common test is the violet color which the salt imparts to a nonluminous flame. Chlorplatinic acid yields a yellow crystalline precipitate which is only slightly soluble in water, less soluble in alcohol. Sodium bitartrate T. S. added to a solution of a potassium salt will precipitate the insoluble potassium bitartrate.

Q.—How did the early settlers in this country get potash for making soft soap?

A.—They burned hardwood for fuel, the ashes of the hardwood were collected in bins, then the potash was obtained by pouring water on the ashes and allowing it to run or percolate through dissolving the soluble matter which was collected at an outlet at the bottom. This liquid was evaporated to the required consistence and constituted the potash. It was largely potassium carbonate.

Q.—What name is applied to such process?

A.—Lixiviation.

Q.—What can you say of the general solubility of the potassium salts?

A.—They are all easily soluble in water with one exception.

Q.—What is the one insoluble salt?

A.—Potassium bitartrate, soluble in 155 parts of water and in 8820 parts of alcohol.

Q.—How is **Potassium Acetate** made?

A.—By neutralizing a solution of potassium bicarbonate with acetic acid, then adding a slight excess of acid. Next the solution is quickly evaporated and the salt obtained by crystallization.

Q.—Why is the bicarbonate used instead of the carbonate which is much cheaper?

A.—The bicarbonate is so much more pure than the carbonate and of course makes a purer acetate.

Q.—What is this salt therapeutically?

A.—Diuretic; dose 1 Gm., or 15 gr.

Q.—What preparations are official?

A.—Elixir of Buchu and Potassium Acetate, Elixir of Potassium Acetate, Elixir of Potassium Acetate and Juniper.

Q.—How does exposure to air affect Potassium Acetate?

A.—It is very deliquescent.

Q.—How pure must **Potassium Bicarbonate** be?

A.—99%.

Q.—How is this salt made?

A.—By passing a stream of carbon dioxide into a solution of potassium carbonate until it is thoroughly saturated, then evaporating the solution at low temperature to prevent decomposition.

Q.—What name is sometimes given to the crude salt?

A.—Sal aeratus.

Q.—How does exposure to the air affect this salt?

A.—No effect, permanent in the air.

Q.—What pharmaceutical use is made of this salt?

A.—Used as a source of other potassium salts because of its purity.

Q.—How soluble is it?

A.—Soluble in 2.8 parts of water.

Q.—What is it therapeutically?

A.—Antacid, dose 1 Gm., or 15 gr.

Q.—How much heat is necessary to convert it to the carbonate?

A.—The heat of boiling water will completely convert it.

Q.—What is the common name for **Potassii Bitartras?**

A.—Cream of Tartar.

Q.—How pure must it be?

A.—99.5%.

Q.—What is the source of this salt?

A.—Obtained from argol, a substance deposited in wine casks during the fermentation of grape juice.

Q.—Into what so-called food product does Potassium Bitartrate enter?

A.—Baking powders.

Q.—How does exposure to the air affect it?

A.—No effect, permanent in air.

Q.—What is it therapeutically?
A.—Laxative and refrigerant.

Q.—What is the dose?
A.—2 Gm., or 30 gr.

Q.—What preparations are official?
A.—Pulvis Jalapae Compositus, U. S. P., Trochisci Sulphuris et Potassii Bitartras, N. F.

Q.—How pure must **Potassium Bromide** be?
A.—98.5%.

Q.—How is this salt made?
A.—There are two methods in use, ferrous bromide is made by reacting on iron with bromine, then this is decomposed with potassium carbonate. Ferrous carbonate is precipitated and filtered off, the potassium bromide is in solution and is then obtained by evaporation until it crystallizes. The other method, potassium hydroxide is treated with bromine, this forms potassium bromide and some potassium bromate, the bromate is reduced with charcoal to bromide, carbon monoxide being driven off.

Q.—How does exposure to the air affect the salt?
A.—Has no effect, permanent in the air.

Q.—What is the salt therapeutically, and dose?
A.—Sedative; dose 1 Gm., or 15 gr.

Q.—Are there any U. S. P. preparations of this salt?
A.—No.

Q.—Name those official in the N. F.
A.—Elixir Potassii Bromidi, Elixir Trium Bromidorum, Mistura Chlorali et Potassii Bromidi Composita, Sal Potassii Bromidi Effervescens, Sal Potassii Bromidi Effervescens Compositus, Syrupus Bromidorum.

Q.—What is the common name for **Potassii Carbonas?**
A.—Salt of tartar, also known as sal tartar.

Q.—How pure must it be?
A.—99% when dried to a constant weight at 180° C.

Q.—What is the limit of moisture which it may contain?
A.—15%.

Q.—What is "pearl ash"?

A.—Impure potassium carbonate.

Q.—How is the U. S. P. potassium carbonate made?

A.—By dissolving pearl ash in water, allowing to stand for 48 hours, filtering and then evaporating to dryness in bright iron dishes.

Q.—How is the purest form of the salt obtained?

A.—By heating the bicarbonate to redness.

Q.—What method is used for producing it in commercial quantities?

A.—The natural potassium chloride as found in mines is treated with sulphuric acid to form the potassium sulphate and this in turn treated with calcium carbonate, which produces insoluble calcium sulphate and the potassium carbonate is in solution.

Q.—Why must it be kept in air-tight containers?

A.—So it will not absorb moisture.

Q.—What is it therapeutically?

A.—Antacid, but is seldom used as the bicarbonate is so much more agreeable. Dose is 1 Gm., or 15 gr.

Q.—Is it caustic?

A.—Yes, rather so in large doses.

Q.—What is the antidote?

A.—Lemon juice, diluted vinegar, citric and tartaric acids.

Q.—How soluble is it?

A.—Soluble in 0.9 its weight of water.

Q.—How soluble is it in alcohol?

A.—Insoluble.

Q.—Are there any preparations of it official?

A.—No, not of the salt itself, but it enters a large number of preparations because of its solubility and alkalinity.

Q.—Give the official definition for **Potassii Chloras.**

A.—It contains not less than 99% of $KClO_3$. Great caution should be observed in handling it, as dangerous explosions are liable to occur when it is heated or subjected to concussion or trituration with organic substances (cork, tannin, dust, sugar, etc.) or with sulphur, sulphides, hypophosphites or other easily oxidizable substances.

Q.—What makes it so likely to explode?

A.—It contains a considerable quantity of oxygen with which it will part quite readily, and in the presence of some substance which will take this oxygen readily the reaction is so energetic that explosion takes place.

Q.—How is **Potassium Chlorate** made?

A.—It may be made by first boiling a solution of calcium hypochlorite which decomposes into calcium chlorate and calcium chloride; then the calcium chlorate solution is heated with a solution of potassium chloride. This results in a double decomposition, producing potassium chlorate and calcium chloride. The potassium chlorate is much less soluble than calcium chloride and is readily separated.

Q.—What is the solubility of potassium chlorate?

A.—1 Gm. dissolves in 11.5 mils of water.

Q.—What happens when potassium chlorate is heated?

A.—Oxygen is given off and potassium chloride forms.

Q.—What commercial use is made of it?

A.—It is used as a source of oxygen.

Q.—What is it therapeutically?

A.—Antiseptic.

Q.—How is it used?

A.—Generally put into solution and used as a gargle.

Q.—What is the dose?

A.—1 Gm., or 15 grains.

Q.—What N. F. preparation is official?

A.—Trochisci Potassii Chloratis.

Q.—What N. F. preparation is official?

A.—Gargarisma Guaiaci Compositum.

Q.—What effect does exposure to air have on it?

A.—No effect, it is permanent in air.

Q.—Give the official definition for **Potassii Citras.**

A.—It contains when dried to constant weight in a desiccator over sulphuric acid, not less than 99% of $K_3C_6H_5O_7 + H_2O$. Preserve it in well-closed containers.

Q.—How is it made?

A.—By adding potassium carbonate or bicarbonate to a solution of citric acid until effervescence ceases, then filtering the solution and obtaining the salt by evaporation to dryness.

Q.—Which is the purer salt, that made from potassium carbonate or bicarbonate?

A.—That made from the bicarbonate.

Q.—What impurity is likely to be found in that made from potassium carbonate?

A.—Silica.

Q.—How does this affect the salt?

A.—It makes it less soluble in water.

Q.—What is its solubility?

A.—1 Gm. dissolves in 0.6 mils of water.

Q.—How does exposure to air affect it?

A.—It is deliquescent.

Q.—What is it therapeutically?

A.—Diaphoretic, dose 1 Gm., or 15 grains.

Q.—What pharmaceutical use is made of it?

A.—An ingredient of many preparations for the purpose of inducing solubility.

Q.—What U. S. P. preparation is official?

A.—Potassii Citras Effervescens.

Q.—What is the purity rubric for **Potassii et Sodii Tartras?**

A.—It contains not less than 73.72% nor more than 77.39% of anhydrous potassium and sodium tartrate, corresponding to not less than 99% of crystallized salt, $KNaC_4H_4O_6 + 4\ H_2O$. Preserve it in well-closed containers.

Q.—What is the synonym?

A.—Rochelle Salt.

Q.—How is it made?

A.—By adding correct quantity of potassium bitartrate to a solution of sodium carbonate. The solution is filtered and evaporated until the salt just starts to separate, then it is set aside for the crystals to form.

Q.—How soluble is it?

A.—1 Gm. dissolves in 0.9 mil of water.

Q.—How does exposure to the air affect it?
A.—Slightly efflorescent.

Q.—What is it therapeutically?
A.—Purgative.

Q.—What is the dose?
A.—10 Gm. or 2½ drachms.

Q.—What preparation is official?
A.—Pulvis Effervescens Compositus. (Seidlitz powder.)

Q.—Give the synonyms for **Potassium Hydroxide.**
A.—Caustic potash, potassium hydrate.

Q.—How pure must it be?
A.—Must contain not less than 85% KOH.

Q.—How must it be stored?
A.—In well-closed containers.

Q.—What kind of glass bottles should be used in storing it?
A.—Hard glass because the caustic potash will attack soft glass.

Q.—How is potassium hydroxide made?
A.—By adding a thick mixture of slaked lime and water to a hot solution of potassium carbonate. The calcium carbonate which forms is insoluble hence precipitates and the solution of potassium hydroxide may be decanted. This solution may now be evaporated to an oily consistence and poured into moulds.

Q.—How does exposure to air affect it?
A.—It is very deliquescent, also absorbs carbon dioxide.

Q.—How does it affect organic tissue?
A.—Destroys it with great rapidity, therefore great care must be used in handling it.

Q.—In case it is necessary to handle it, what precautions should be taken?
A.—The fingers should be protected by covering them with petrolatum, or wrapping the stick with tin foil.

Q.—What is meant by Potassa by Alcohol?
A.—A purified potassium hydroxide made by dissolving the hydroxide in alcohol.

Q.—What preparation is official?
A.—Liquor Potassii Hydroxidi.

Q.—What use is made of potassium hydroxide?

A.—It is used in veterinary practice as a caustic. It is used in making other salts and compounds.

Q.—Give the purity rubric and chemical formula for **Potassii Hypophosphis.**

A.—It contains when dried to constant weight in a desiccator over sulphuric acid, not less than 98% of KPH_2O_2.

Q.—How must it be kept?

A.—In well-closed containers in a dry place.

Q.—Why must it be so kept?

A.—It is very deliquescent.

Q.—What care is to be used in the pharmaceutical use of it?

A.—It must never be triturated or heated with nitrates, chlorates or other oxidizing agents.

Q.—Why must the caution be observed?

A.—Hypophosphites contain the least amount of oxygen of the phosphorus compounds and of course tend to oxidize to phosphites and phosphates. This oxidation may take place with such energy as to cause an explosion.

Q.—How is this salt made?

A.—Double decomposition between solutions of calcium hypophosphite and potassium carbonate. The calcium carbonate which forms is insoluble and is removed by filtration, the potassium hypophosphite which is in solution is obtained by evaporation.

Q.—How may it be purified?

A.—By recrystallization from alcohol.

Q.—What is the solubility of it?

A.—1 Gm., dissolves in 0.6 mil of water; 9 mils alcohol.

Q.—What is it therapeutically?

A.—Tonic.

Q.—What is the dose?

A.—0.5 Gm., or 8 grains.

Q.—What U. S. P. preparation is official?

A.—Syrupus Hypophosphitum.

Q.—What N. F. preparations are official?

A.—Elixir hypophosphitum, elixir hypophosphitum et ferri, emulsum olei morrhuæ cum hypophosphitibus, liquor hypophos-

phitum, liquor hypophosphitum compositus, syrupus hypophosphitum compositus.

Q.—What is the chemical formula for **Potassii Iodidum?**
A.—KI.

Q.—What purity is required by the U. S. P.?
A.—When dried to a constant weight it must contain not less than 99% of KI.

Q.—How is it made?
A.—An excess of iodine is added to a solution of potassium hydroxide. This forms five parts of potassium iodide and one part of potassium iodate. The iodate is treated with charcoal which is a reducing agent and combines with oxygen of the iodate and reduces it to iodide.

Q.—Show the equation for making potassium iodide.
A.—$6\ KOH + I_6 = 5\ KI + KIO_3 + 3\ H_2O$, then
$KIO_3 + 3\ C = KI + 3\ CO$.

Q.—Is this the only method for making it?
A.—No, it may also be made by treating ferric iodide with potassium carbonate. Ferric hydroxide forms and is insoluble and is filtered out. The solution contains the potassium iodide which is obtained by crystallization.

Q.—Is the solution from which it is crystallized acid or alkaline in reaction?
A.—Slightly alkaline.

Q.—Why must it be alkaline?
A.—If it is acid or neutral, iodine separates and discolors the product.

Q.—How does exposure to air affect it?
A.—Dry air does not affect it, but if the air is moist it is slightly deliquescent.

Q.—How soluble is it?
A.—1 Gm. will dissolve in 0.7 mil of water.

Q.—What use is made of it pharmaceutically?
A.—Because of its ready solubility, solutions of it are used to dissolve iodine and insoluble iodides.

Q.—What is it therapeutically?
A.—Alterative.

Q.—What is the dose?
A.—0.3 Gm., or 5 grains.

Q.—What U. S. P. preparations does it enter?
A.—Liquor iodi compositus, tinctura iodi, unguentum iodi.

Q.—Why is it used in these preparations?
A.—In the compound solution and the ointment for the purpose of dissolving iodine. In the tincture to satisfy the affinity of the alcohol for the iodide radicle, so it will not take up iodine and thus make the tincture under strength.

Q.—Does this not make the tincture more readily miscible with water?
A.—It may but this is only incidental.

Q.—Should solutions of potassium iodide be kept in stock?
A.—No, the iodine soon separates and the solution is colored yellow. It is so readily soluble in water that there seems to be no necessity for it.

Q.—What is the synonym for **Potassii Nitras?**
A.—Saltpetre.

Q.—By what other names it is called?
A.—Nitre and sal nitre.

Q.—How is it made?
A.—It is found in some rainless districts as a natural product. Most of it, however, is made in India in so-called nitre beds. These are made up of earth, wood ashes, animal and vegetable refuse. They are protected from rain by crude wooden structures. In the course of time the organic matter decomposes, producing ammonia, which is oxidized to nitric acid. The nitric acid so formed reacts with the potassium in the wood ashes to produce potassium nitrate. The mass is then treated with water which dissolves out the potassium nitrate, the solution is evaporated, and the salt obtained by crystallization.

Q.—How pure must it be?
A.—When dried to a constant weight at 100° C. it must contain not less than 99% KNO_3.

Q.—How does exposure to air affect it?
A.—In moist air it is slightly deliquescent.

Q.—How soluble is it?
A.—1 Gm. dissolves in 2.8 mils of water.

Q.—What effect does high heat have on it?
A.—Reduces it to the nitrite.

Q.—What commercial use is made of it?
A.—Large quantities of it are used in the manufacture of gunpowder. It is also used in rather concentrated solution for preserving or "curing" meats.

Q.—What is it therapeutically?
A.—Diuretic and diaphoretic.

Q.—What is the dose?
A.—0.5 Gm., or 8 grains.

Q.—Is it poisonous?
A.—Not in medicinal doses but very large doses have been known to produce untoward results and deaths have been reported where individuals had taken very large doses in mistake for Epsom salt.

Q.—What N. F. preparation is official?
A.—Charta Potassii Nitratis.

Q.—What is the chemical formula for **Potassii Permanganas**?
A.—$KMnO_4$.

Q.—How pure must it be?
A.—99% when dried to constant weight.

Q.—What precaution must be observed in handling it?
A.—It must not be brought in contact with organic or other readily oxidizable substances.

Q.—Why must this precaution be observed?
A.—It parts with its oxygen so readily that explosion is likely to occur.

Q.—How is this salt made?
A.—By boiling a solution of potassium manganate in water. It may also be made by passing carbon dioxide through a solution of potassium manganate.

Q.—What is the color of the crystals?
A.—Dark purple.

Q.—How must the salt be stored?
A.—In glass-stoppered bottles.

Q.—Why not in cork-stoppered bottles?

A.—Cork is organic, hence sufficient cork dust might be thrown into the salt to cause an explosion.

Q.—What is the principal use made of it?

A.—As an oxidizing solution in analytical chemistry.

Q.—What is it therapeutically?

A.—Antiseptic.

Q.—What is the dose?

A.—0.06 Gm., or 1 grain.

Q.—It is ever used as a poison antidote?

A.—Yes, in poisoning by morphine.

Q.—How is it used?

A.—Given in dilute solution. Its oxidizing action on morphine converts it to a nonpoisonous compound.

Q.—If it is to be applied to the part for its antiseptic or disinfectant properties, why must the use of a towel or cotton be avoided?

A.—They being organic would cause the salt to give up its oxygen, which is the element of value, before it reached the body.

Q.—What is the synonym for **Potassa Sulphurata?**

A.—Liver of sulphur.

Q.—Is it a true salt?

A.—No, it is a mixture of potassium polysulphides and potassium thiosulphate.

Q.—What is the rubric for it?

A.—It must contain sulphides corresponding to not less than 12.8% of sulphur.

Q.—How is it made?

A.—By first thoroughly mixing 1 part of sublimed sulphur with 2 parts of potassium carbonate, then completely fusing them in an iron crucible. Then pour it on a slab to cool, when cold it is broken in convenient pieces and stored in well-stoppered bottles.

Q.—Why must it be kept in tightly stoppered bottles?

A.—It rather rapidly loses its value because of the ready absorption of oxygen, moisture, and carbon dioxide from the air.

Q.—Is it water-soluble?
A.—Yes, readily so.

Q.—What use is made of it?
A.—As an antiseptic and germicide in the treatment of certain skin diseases.

Q.—Into what common but unofficial solution does it enter?
A.—Lotio Alba or White Lotion.

Q.—Name the three Potassium compounds which are official in the N. F.
A.—Potassium chloride, potassium sulphate, and potassa cum calx.

Q.—Is Potassa cum Calx a compound?
A.—No, it is really a mixture of a potassium salt and a calcium salt.

Q.—How pure must **Potassii Chloridum** be?
A.—Not less than 99%.

Q.—What is the source of this salt?
A.—It is found as a natural product, sylvite a crude potassium chloride and as carnallite (potassium magnesium chloride $KCl.MgCl_2.6H_2O$). From the carnallite the potassium chloride is obtained by dissolving the mineral in a small amount of hot water and allowing the solution to cool. The potassium chloride is deposited and the easily soluble magnesium chloride remains in the mother liquor. The salt may of course be made by dissolving potassium carbonate in hydrochloric acid.

Q.—What is the solubility of the salt?
A.—1 Gm. dissolves in 2.8 mils of water.

Q.—How does exposure to air affect it?
A.—No effect, it is permanent in dry air.

Q.—What use is made of it?
A.—It enters some of the official artificial salts.

Q.—How pure must **Potassii Sulphas** be?
A.—Must contain not less than 99% of K_2SO_4.

Q.—What is the source of this salt?
A.—It is found deposited in certain mines as a double salt, schoenite ($K_2SO_4.MgSO_4.6H_2O$) and as a kainite ($K_2SO_4.MgSO_4.MgCl_2.6H_2O$) it is obtained from these by treating with potas-

sium chloride and dissolving in a small quantity of warm water when the less soluble potassium sulphate separates out, leaving the other more soluble salts in solution.

Q.—What is the solubility of the salt?
A.—1 Gm. dissolves in 10 mils of water.

Q.—What is the salt therapeutically?
A.—Cathartic.

Q.—What is the dose?
A.—1 Gm., or 15 grains.

Q.—What pharmaceutical use is made of it?
A.—It is used to make alum and enters some of the artificial salts which are cathartics.

Q.—What commercial use is made of it?
A.—Has been used as a fertilizer.

Q.—What striking physical property do the crystals possess?
A.—They are very hard and are reduced to a fine powder only by persistent and diligent trituration.

Q.—What is the common name for **Potassa cum Calce?**
A.—Vienna Paste.

Q.—What is it made from?
A.—From equal weights of Potassium Hydroxide and Calcium Oxide.

Q.—How is it made?
A.—The ingredients are triturated together in a warm mortar until a powder is formed.

Q.—How must it be kept?
A.—In well-closed containers.

Q.—What is it therapeutically?
A.—A caustic.

SODIUM AND ITS COMPOUNDS

Q.—What is the symbol and atomic weight of **Sodium?**
A.—Na.; 23.

Q.—Why are the letters "Na" used to represent Sodium?
A.—It is because the ancient Latin name for sodium was Natrium.

Q.—How does exposure to air affect it?
A.—It unites with the oxygen very rapidly.

Q.—Is the metal kept in water?
A.—No, it must be kept in some liquid which has no oxygen, hence kerosene or gasoline is used.

Q.—What happens when the metallic sodium is placed in water?
A.—It decomposes water and forms the hydroxide liberating one atom of hydrogen from each molecule of water.

Q.—Does the hydrogen burn as in the case of potassium?
A.—No, the reaction is not quite so energetic, but the piece of sodium moves about.

Q.—Is sodium lighter or heavier than potassium?
A.—Heavier.

Q.—Are the salts of sodium more or less soluble than those of potassium?
A.—Generally more soluble.

Q.—As therapeutic agents is it generally the basic or acid end of the salts that is of value?
A.—Ordinarily the acid end.

Q.—Then is there any great difference between the potassium and sodium salts?
A.—No, but some medical men are of the opinion that the sodium ion is less active and less depressant than the potassium ion and for this reason prefer the sodium salts.

Q.—What is the rubric for **Sodii Acetas?**
A.—It must contain not less than 59.57% nor more than 62.96% of anhydrous sodium acetate, corresponding to not less than 99.5% of crystallized salt.

Q.—What is the chemical formula for it?
A.—$NaC_2H_3O_2$.

Q.—How is it made?
A.—Reaction between a solution of sodium carbonate and acetic acid, then evaporation and crystallization.

Q.—What effect does exposure to air have on it?
A.—Efflorescent in warm air.

Q.—What is its solubility?
A.—Soluble 1 Gm. in 0.8 mil of water.

Q.—What is it therapeutically, and dose?
A.—Diuretic, dose 1 Gm., or 15 grains.

Q.—What is the English name for **Sodii Arsenas**?
A.—Sodium arsenate.

Q.—What is the chemical name for the official salt?
A.—Di-sodium ortho-arsenate.

Q.—Give the chemical formula for it.
A.—$Na_2HAsO_4 + 7\ H_2O$.

Q.—How pure must it be?
A.—99%.

Q.—What effect does exposure to air have on it?
A.—It is efflorescent in dry air, but deliquescent in moist air.

Q.—How is the salt made?
A.—Arsenic trioxide, sodium nitrate and sodium carbonate are fused together and heated to redness. This mass dissolved in water and crystallized. This will form the pyroarsenate $Na_4As_2O_7$, if this is now allowed to stand in water, it will form Na_2HAsO_4.

Q.—Is it poisonous?
A.—Yes, very.

Q.—What is the antidote?
A.—Ferric Hydroxide with Magnesium Oxide.

Q.—How soluble is the salt?
A.—1 Gm. of the salt dissolves in 1.5 mils of water.

Q.—What is it therapeutically?
A.—Alterative and tonic.

Q.—What is the dose?
A.—0.005 Gm., or 1/12 grain.

Q.—What do the letters P. I. mean which are seen in the synonym Arsenas Sodii P. I.?
A.—They mean that this salt meets the requirements of the International Protocol for Sodium Arsenate.

Q.—What official salt is made from this?
A.—**Sodii Arsenas Exsiccatus.**

Q.—What is another name for this salt?
A.—Dried sodium arsenate.

Q.—How is it made?
A.—The sodium arsenate crystals are heated to a temperature between 40° and 50° C. until the crystals are effloresced and completely disintegrated. The heat is then gradually increased to 150° C. and continued until it ceases to lose weight.

Q.—What is the dose of this salt?
A.—0.003 Gm., or 1/20 grain.

Q.—What U. S. P. solution is official?
A.—Liquor Sodii Arsenatis.

Q.—What is the strength?
A.—1%.

Q.—What N. F. preparation is official?
A.—Liquor Sodii Arsenatis, Pearson.

Q.—What is the strength?
A.—1/10%.

Q.—What is the purity rubric for **Sodii Benzoas**?
A.—It contains when dried to constant weight at 110° C. not less than 99% of $NaC_7H_5O_2$.

Q.—How is it made?
A.—By adding benzoic acid to a hot, strong solution of sodium carbonate until no more carbon dioxide is given off. The solution is then concentrated until the salt crystallizes out.

Q.—What use is made of it commercially?
A.—Used as food preservative to prevent fermentation.

Q.—Is such use permitted by the Government?
A.—Yes, if the quantity used is stated on the label.

Q.—What objection is there to such use?
A.—As the process of digestion is a process of fermentation, it would seem that any agent which would prevent fermentation would also prevent digestion of the food.

Q.—What is it therapeutically?
A.—Antiseptic, diuretic, antirheumatic.

Q.—What is the dose?
A.—1 Gm., or 15 grains.

Q.—What are the synonyms for **Sodii Benzosulphonidum?**
A.—Sodium-Saccharin. Soluble Saccharin.

Q.—How is it made?
A.—By neutralizing saccharin with sodium bicarbonate.

Q.—What use is made of it?
A.—Used primarily as a sweetening agent, but is also antiseptic.

Q.—Is it more or less sweet than saccharin?
A.—Less sweet.

Q.—How sweet is it as compared with sugar?
A.—400 times sweeter than sugar.

Q.—How is it generally used in a medicinal way?
A.—Used to replace sugar with patients afflicted with diabetes.

Q.—How soluble is it?
A.—1 Gm. dissolves in 1.2 mils of water.

Q.—What salt results from the incineration of this salt?
A.—Sodium sulphate.

Q.—What effect does exposure to the air have on it?
A.—Slightly efflorescent.

Q.—How does the Pure Food and Drugs Act view this salt?
A.—It prohibits its use as a sweetening agent in foods and beverages.

Q.—What is the dose?
A.—0.2 Gm., or 3 grains.

Q.—What common name is applied to **Sodii Bicarbonas?**
A.—Baking soda.

Q.—How pure must it be?
A.—It contains, when dried to a constant weight in a desiccator over sulphuric acid, not less than 99% of $NaHCO_3$.

Q.—How is it made?
A.—May be made by treating sodium carbonate with carbonic acid, that is, carbon dioxide and water. Commercially prepared by the Solvay process, in which carbon dioxide is passed into a solution of common salt in ammonia water. Sodium bicarbonate, being less soluble, settles out and ammonium chloride remains in solution.

Q.—How soluble is it?
A.—1 Gm. dissolves in 10 mils of water.

Q.—How does exposure to air affect it?
A.—Permanent in dry air but slowly decomposes in moist air.

Q.—How does a solution of it react toward indicators?
A.—Alkaline.

Q.—What happens when the salt is heated?
A.—It is converted into sodium carbonate, losing water and carbon dioxide.

Q.—What commercial use is made of it?
A.—Used in the manufacture of baking powders.

Q.—What is it therapeutically?
A.—Antacid, dose 1 Gm. or 15 grains.

Q.—What preparation of it is official?
A.—Trochisci Sodii Bicarbonatis.

Q.—What pharmaceutical use is made of it?
A.—Used for its alkalinity in some preparations, in others used because of the carbon dioxide which it gives up when decomposed by an acid.

Q.—Give the synonyms for **Sodii Boras.**
A.—Borax. Sodium Tetraborate. Sodium Pyroborate.

Q.—What is its chemical formula?
A.—$Na_2B_4O_7 + 10H_2O$.

Q.—How pure must it be?
A.—It must contain not less than 99% of the crystallized salt.

Q.—What is the source of Borax?
A.—It is found as a natural deposit in California, Thibet and Persia. It may be made by fusing boric acid with sodium carbonate.

Q.—What common name is applied to it in Oriental countries?
A.—Tincal.

Q.—What is its solubility?
A.—1 Gm. dissolves in 15 mils of water; in 1 mil of glycerin.

Q.—How does its solution react toward indicators?
A.—Alkaline.

Q.—How does the solution effect tumeric paper?

A.—Turns it reddish-brown, which is an identity test.

Q.—What is it therapeutically?

A.—Antacid and diuretic.

Q.—How does exposure to the air affect it?

A.—It effloresces.

Q.—Why is it rather popular as an ingredient of tooth-powders and mouth washes?

A.—Because of its slight alkalinity which tends to neutralize an acid condition of the mouth that is harmful to the teeth.

Q.—What is the dose?

A.—0.75 Gm., or 12 grains.

Q.—What must be the purity of **Sodii Bromidum**?

A.—It must contain when dried to a constant weight at 100° C. not less than 98.5% NaBr.

Q.—How is it made?

A.—Usually by decomposing Ferrous Bromide with Sodium Carbonate. By this process ferrous carbonate is formed, and being insoluble, may be removed by filtration. The sodium bromide in solution is then obtained by evaporation.

Q.—Is this the only way in which it may be produced?

A.—No, it may also be produced in a manner similar to that outlined for potassium bromide. Bromine is added to a solution of sodium hydroxide which produces sodium bromide and bromate, the bromate is then reduced to bromide by treatment with charcoal.

Q.—What is its solubility?

A.—1 Gm. dissolves in 1.1 mil of water.

Q.—How does exposure to the air affect it?

A.—It will absorb moisture from the air, but does not deliquesce.

Q.—What is it therapeutically?

A.—A nerve sedative.

Q.—What is the dose?

A.—1 Gm., or 15 grains.

Q.—What N. F. preparations are official?
A.—Elixir sodii bromidi, elixir trium bromidorum, syrupus bromidorum.

Q.—What is the chemical name for **Sodii Cacodylas**?
A.—Sodium dimethyl arsenate.

Q.—How is the salt made?
A.—By distilling arsenic trioxide with potassium acetate, then oxidizing with mercuric oxide, to form cacodylic acid, which is neutralized with sodium hydroxide. This liquid is then evaporated until the salt crystallizes out.

Q.—Is the salt always uniform?
A.—No, it crystallizes with variable amounts of water of crystallization.

Q.—How does exposure to air affect it?
A.—It is deliquescent.

Q.—What is its solubility?
A.—1 Gm. dissolves in 0.5 mil of water.

Q.—What is it therapeutically?
A.—Alterative and tonic.

Q.—What is the dose?
A.—0.06 Gm., or 1 grain.

Q.—Has this salt been official a long time?
A.—No, it was made official for the first time in U. S. P. IX.

Q.—How pure must **Sodii Carbonas Monohydratus** be?
A.—It must contain not less than 99.5% of $Na_2CO_3 + H_2O$.

Q.—Why is the word "monohydrated" used in naming this salt?
A.—Because it contains only one molecule of water of crystallization.

Q.—But why is so much stress laid on the fact that it contains water of crystallization, since it is not done with any other salt?
A.—Sodium carbonate regularly crystallizes with ten molecules of water of crystallization, hence it is necessary to designate the official as above indicated.

Q.—Why is the kind with 10 molecules of water of crystallization not official?
A.—Because it is efflorescent and loses variable amounts of its water of crystallization.

Q.—Why is not all the water of crystallization driven off and the dried made official?

A.—Because upon exposure to the air it will take on one molecule of water of crystallization.

Q.—Finally, then, why is the monohydrated variety made official?

A.—Because it is the most stable variety.

Q.—How is it made?

A.—By crystallizing a solution of sodium carbonate at a temperature above 35°C.

Q.—What effect does exposure to air have on it?

A.—In dry air above 50° C. it effloresces, at a temperature of 100° C. it becomes anhydrous.

Q.—How soluble is it?

A.—1 Gm. dissolves in 3 mils of water.

Q.—What is it therapeutically?

A.—Antacid; but it is not often used for that purpose as the bicarbonate is more agreeable.

Q.—What is the dose?

A.—0.25 Gm., or 4 grains.

Q.—What common names are applied to the dekhydrated sodium carbonate?

A.—Sal soda; washing soda.

Q.—What common names are applied to **Sodii Chloridum?**

A.—Common salt, table salt, salt.

Q.—What is its source?

A.—Found in mines as "rock salt," in the oceans, in Great Salt Lake in Utah.

Q.—How is most of it obtained?

A.—By the partial spontaneous evaporation of sea water and water of salt lakes, then finished by the application of artificial heat.

Q.—What is its solubility?

A.—1 Gm. dissolves in 2.8 mils of water.

Q.—How does exposure to the air affect it?

A.—It is quite permanent in air.

Q.—Why is it then that the U. S. P. describes it as being slightly hygroscopic and that in use on the table it so frequently seems to be moist and soggy?

A.—Because it is almost always contaminated with small quantities of calcium chloride or magnesium chloride, both of which are deliquescent.

Q.—What preparation is official?

A.—Liquor Sodii Chloridi Physiologicus.

Q.—Are there any N. F. preparations of it?

A.—It enters a number of the official artificial salts and through them some of the effervescent salts.

Q.—What is it therapeutically?

A.—It is antiseptic, used as a styptic in hemorrhage; given with hot water it is emetic.

Q.—What is it commonly used for?

A.—As a condiment, in which way the body tissues and fluids get the quantity which they require.

Q.—What is the dose?

A.—15 Gm., or 4 drachms.

Q.—What is the rubric for **Sodii Citras?**

A.—It contains not less than 98% $Na_3C_6H_5O_7 + 2H_2O$.

Q.—How is it made?

A.—Made by neutralizing a solution of Citric Acid with Sodium Carbonate, then obtaining the salt by evaporation.

Q.—What is its solubility?

A.—1 Gm. dissolves in 1.3 mils of water.

Q.—Are there any U. S. P. preparations of it?

A.—No, but it is used in a number of preparations to promote solubility in otherwise insoluble substances.

Q. What is it therapeutically?

A.—Diaphoretic and diuretic.

Q.—What is the dose?

A.—1 Gm., or 15 gr.

Q.—What is the chemical formula for **Sodii Cyanidum?**

A.—NaCN.

Q.—How pure must it be?
A.—Must contain not less than 95% NaCN.

Q.—What compound does this replace?
A.—Potassium cyanide of the U. S. P. VIII.

Q.—How is the salt made?
A.—Several processes are in use; fusing calcium cyanide and sodium carbonate, the mixture is then treated with hot water, the solution is then caused to crystallize. Also made by passing dry ammonia gas over metallic sodium at a temperature of 350° C.; this product is then treated with red hot charcoal, forming sodium cyanide.

Q.—Is the salt poisonous?
A.—Yes, just as poisonous as hydrocyanic acid.

Q.—Is it given internally?
A.—Not commonly as the U. S. P. does not give a dose for it.

Q.—What is the treatment for poisoning by this salt?
A.—Solution of ferrous sulphate, then empty the stomach; artificial respiration.

Q.—What is the synonym for **Sodii Glycerophosphas?**
A.—Sodium glycerinophosphate.

Q.—Give the official definition or purity rubric.
A.—Hydrated Sodium Glycerophosphate containing not less than 68% of the anhydrous salt $Na_2C_3H_7PO_6$ or $C_3H_5(OH)_2$-PO_4Na_2.

Q.—How is the salt made?
A.—May be made by decomposing either barium or calcium glycerophosphate with sodium carbonate.

Q.—Is that the only way in which it can be made?
A.—No, glycerophosphoric acid may be neutralized with sodium carbonate and this solution evaporated in vacuum.

Q.—What is it therapeutically?
A.—A nerve tonic.

Q.—What U. S. P. preparation is there?
A.—Liquor Sodii Glycerophosphatis.

Q.—What is the dose of the salt?
A.—0.25 Gm., or 4 grains.

Q.—What can you say of its solubility?
A.—Very soluble in hot or cold water; nearly insoluble in alcohol.

Q.—Give the synonyms for **Sodii Hydroxidum.**
A.—Caustic Soda. Sodium Hydrate.

Q.—How pure must it be?
A.—Must contain not less than 90% of NaOH.

Q.—What kind of glass must be used in bottles in which it is kept?
A.—Hard glass.

Q.—Why must it be hard glass?
A.—Because the sodium hydroxide reacts with soft glass, thus destroying the bottle and becomes impure itself.

Q.—How is it made?
A.—May be made by direct reaction between metallic sodium and water, then evaporating the solution. Also by reaction between sodium carbonate and milk of lime, then concentrating the solution of sodium hydroxide in iron dishes or silver dishes until it will harden on cooling. The concentrated liquid is poured into silver moulds which forms it into the round sticks which are seen in the stores.

Q.—How does exposure to air affect it?
A.—It deliquesces, absorbs carbon dioxide and becomes coated with sodium carbonate.

Q.—What is its solubility?
A.—1 Gm. dissolves in 0.9 mil water; readily soluble in alcohol.

Q.—What use is made of it?
A.—It is used in the making of many preparations because of its great alkalinity.

Q.—Is it given internally?
A.—Not in the substance, the U. S. P. gives no dose for it.

Q.—Is it possible to use Sodium Hydroxide when Potassium Hydroxide is directed?
A.—Yes, unless it is necessary to form a potassium compound, but if only an alkali is necessary the sodium hydroxide may be used.

Q.—In that case is the same weight of Sodium Hydroxide used as was directed for Potassium Hydroxide?

A.—No, the weight used must be proportional to the molecular weights of the hydroxides.

Q.—What is the Latin name for **Sodium Hypophosphite?**

A.—Sodii Hypophosphis.

Q.—How pure must it be?

A.—98%.

Q.—What is its chemical formula?

A.—$NaPH_2O_2 + H_2O$.

Q.—What care must be used in handling it?

A.—Must not be triturated or heated with nitrates, chlorates or other oxidizing agents as explosion is likely to occur.

Q.—How is the salt made?

A.—By double decomposition between Calcium Hypophosphite and Sodium Carbonate or Sulphate. After the insoluble Calcium salt has been removed, the solution is evaporated to dryness.

Q.—What effect does exposure to air have on it?

A.—It is deliquescent in moist air.

Q.—What decomposition takes place when the salt is heated?

A.—It first loses its water of crystallization, then inflammable hydrogen phosphide forms.

Q.—What is this salt therapeutically?

A.—Tonic; dose 1 Gm., or 15 grains.

Q.—What U. S. P. preparation is official?

A.—Syrupus Hypophosphitum.

Q.—What N. F. Syrup contains it?

A.—Syrupus Hypophosphitum Compositus.

Q.—What is the synonym for **Sodii Indigotindisulphonas?**

A.—Indigo Carmine.

Q.—What is the official definition for this salt?

A.—Chiefly the sodium salt of indigotindisulphonic acid.

Q.—What is its chemical formula?

A.—$C_{16}H_8O_2N_2(SO_3Na)_2$.

Q.—In what color and form is it usually seen?

A.—As a blue powder or a dark purple paste.

Q.—What use is made of it?
A.—Used for coloring the official Mercuric Chloride tablet.

Q.—What is the chemical formula for **Sodium Iodide?**
A.—NaI.

Q.—How is it made?
A.—Method similar to Potassium Iodide, which see.

Q.—Does the salt contain water of crystallization?
A.—No.

Q.—Would it have water of crystallization if crystallized under usual conditions?
A.—Yes.

Q.—How is it crystallized to deprive it of water of crystallization?
A.—At a temperature above 40° C.

Q.—When official sodium iodide is dissolved in water, what change in temperature may be noted?
A.—The temperature rises.

Q.—Is the solution looked upon as a simple solution?
A.—Yes, exactly the same as when potassium iodide is dissolved in water.

Q.—Why then is heat developed?
A.—Because at normal temperature the salt will take on 20% water of crystallization and in so taking it when undergoing solution, it is in the nature of a chemical reaction, hence the heat.

Q.—What is the effect on the salt when exposed to air?
A.—Deliquesces.

Q.—What further effect does this then have on the salt?
A.—It decomposes, losing iodine and assumes a brown tint.

Q.—What is the solubility of the salt?
A.—1 Gm. dissolves in 0.55 mils of water.

Q.—What is it therapeutically, and dose?
A.—Alterative; dose 0.3 Gm., or 5 grains.

Q.—What is the English name for **Sodii Nitris?**
A.—Sodium Nitrite.

Q.—What is the chemical formula?
A.—$NaNO_2$.

Q.—How pure must it be?
A.—Must contain not less than 95% $NaNO_2$.

Q.—How is it made?
A.—By reducing Sodium Nitrate by heating with organic matter or fusing with thin sheets of lead.

Q.—Why must it be kept in well-closed containers?
A.—Exposed to air it becomes oxidized to nitrate and is then unfit for use. It is also deliquescent.

Q.—What is it therapeutically?
A.—A vasodilator.

Q.—What is the dose?
A.—0.06 Gm., or 1 gr.

Q.—What is the rubric for **Sodii Perboras**?
A.—It contains not less than 9% of available oxygen, corresponding to about 86.5% of $NaBO_3 + 4\,H_2O$.

Q.—How must it be kept?
A.—In well-closed containers in a cool place.

Q.—How is it made?
A.—By adding boric acid to a concentrated aqueous solution of sodium peroxide, kept cool by addition of ice and then passing carbon dioxide through the solution. The crystals which separate are washed with alcohol and dried at a temperature of 58° C.

Q.—Is it water-soluble?
A.—Yes.

Q.—What effect does exposure to air have on it?
A.—It is stable in cool dry air, but decomposes, losing oxygen in warm or moist air.

Q.—What reaction takes place when it is dissolved in water?
A.—Hydrogen dioxide forms, also sodium metaborate, then oxygen is slowly evolved.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—How does a solution of sodium perborate differ markedly from solution of hydrogen dioxide?
A.—It is mildly alkaline instead of acid.

Q.—What is the dose?
A.—0.06 Gm., or 1 grain.

Q.—What is the synonym for **Sodii Phenolsulphonas?**
A.—Sodium Sulphocarbolate.

Q.—How pure must it be?
A.—It contains not less than 83.64% nor more than 87.82% of anhydrous sodium phenolsulphonate, corresponding to not less than 99% of the crystallized salt.

Q.—Give the true chemical name and formula.
A.—Sodium paraphenolsulphonate, $NaC_6H_5O.SO_3 + 2H_2O$.

Q.—How is it made?
A.—Equal weights of phenol and sulphuric acid are heated on the boiling water-bath for six hours, the mixture is diluted and neutralized with an excess of barium carbonate. The barium sulphocarbolate thus formed is then decomposed by a solution of sodium carbonate, the solution is filtered, concentrated and set aside to crystallize.

Q.—Is it water-soluble?
A.—Yes, 1 Gm. dissolves in 4.2 mils of water.

Q.—What is it therapeutically?
A.—Antiseptic, used frequently as an intestinal antiseptic in typhoid fever.

Q.—What is the dose?
A.—0.25 Gm., or 4 grains.

Q.—How does exposure to air affect it?
A.—Efflorescent in dry air.

Q.—What must be the purity of **Sodii Phosphas?**
A.—Not less than 39.25% nor more than 44% of the anhydrous salt, corresponding to not less than 99% of the crystallized salt.

Q.—What is the true chemical name for this official salt?
A.—Di-sodium-ortho-phosphate.

Q.—What is the chemical formula?
A.—$Na_2HPO_4 + 12H_2O$.

Q.—How must it be preserved?
A.—In well-stoppered containers in a cool place.

Q.—Why must it be so stored?

A.—It is efflorescent and easily loses its water of crystallization.

Q.—How is it made?

A.—Bone ash produced by burning bones to whiteness, consists of calcium phosphate and calcium carbonate; this when mixed with sulphuric acid precipitates the calcium carbonate as calcium sulphate, and calcium acid phosphate remains in solution in the mass. The mass is extracted with hot water which removes the phosphate and leaves the sulphate on the strainer. Calcium acid phosphate in solution is concentrated and mixed with sodium carbonate to form sodium phosphate. This is obtained by evaporation of the solution.

Q.—What is its solubility?

A.—1 Gm. dissolves in 2.7 mils of water.

Q.—How does heat affect it?

A.—At 100° C. it loses its water of crystallization and at red heat it is converted into sodium pyrophosphate.

Q.—What is it therapeutically?

A.—Mild cathartic and hepatic stimulant.

Q.—What is the dose?

A.—4 Gm., or 1 drachm.

Q.—What official form of Sodium Phosphate is made from the one just described?

A.—**Sodii Phosphas Exsiccatus.**

Q.—What is the rubric for it?

A.—It contains when dried to a constant weight at 110° C. not less than 98% Na_2HPO_4.

Q.—How is it prepared?

A.—The official phosphate containing water of crystallization is allowed to effloresce for several days in warm air at a temperature of from 25° C. to 30° C., then the drying is continued in ovens, the temperature being raised gradually until 100° C. is reached. The temperature is maintained there until the salt ceases to lose weight.

Q.—How soluble is this salt?

A.—1 Gm. dissolves in 8.1 mils of water.

Q.—How does exposure to air affect it?
A.—It absorbs water from the air.

Q.—What is the dose?
A.—2 Gm., or 30 grains.

Q.—Into what official preparation does it enter?
A.—Sodii Phosphas Effervescens.

Q.—What percentage of Exsiccated Sodium Phosphate is there in **Sodii Phosphas Effervescens?**
A.—20%.

Q.—What is the dose of the Effervescent salt?
A.—10 Gm., or 2½ drachms.

Q.—What purity is required for **Sodii Salicylas?**
A.—99.5%.

Q.—What is its chemical formula?
A.—$NaC_7H_5O_3$.

Q.—How is it made?
A.—By neutralizing a solution of sodium bicarbonate with salicylic acid, then adding a trifle more acid to insure slight acidity, then evaporate to dryness.

Q.—Why must the solution be acid when it is concentrated?
A.—If it is crystallized from an alkaline solution, the salt will be of a lead-color in place of white.

Q.—Why must it be evaporated at a rather low temperature?
A.—At a high temperature an odor of phenol is developed.

Q.—What care must be taken in filtering the solution?
A.—It should be filtered through a high grade paper or through glass-wool, for the impurities in the ordinary paper will discolor the salt.

Q.—What effect will the slightest trace of iron have on the salt?
A.—Will give it a reddish tinge.

Q.—What is the solubility of the salt?
A.—1 Gm. will dissolve in 0.9 mil of water.

Q.—What is it therapeutically and dose?
A.—Antirheumatic, dose 1 Gm. or 15 grains.

Q.—What N. F. preparations are official?
A.—Elixir Sodii Salicylatis, Elixir Sodii Salicylatis Compositus.

Q.—What is the synonym for **Sodii Sulphas**?
A.—Glauber's Salt.

Q.—How pure must it be?
A.—It must contain not less than 43.64% nor more than 48% of anhydrous sodium sulphate, corresponding to not less than 99% of the crystallized salt.

Q.—What is the chemical formula for the salt?
A.—$Na_2SO_4 + 10H_2O$.

Q.—How must it be kept?
A.—In well-closed containers in a cool place.

Q.—Why must it be so kept?
A.—It effloresces rapidly in the air.

Q.—How is it made?
A.—It is obtained chiefly as a by-product in the manufacture of ammonium chloride, hydrochloric acid, nitric acid, soda-ash and like products.

Q.—What is its solubility?
A.—1 Gm. dissolves in slightly more than 1 mil. of water.

Q.—Into what preparation does it enter?
A.—Sal Carolinum Factitium and its effervescent salt.

Q.—What is it therapeutically?
A.—Purgative.

Q.—Is it commonly used in practice?
A.—No, it is rather irritant, so magnesium sulphate is preferred. It is much used in veterinary practice.

Q.—Its use in veterinary medicine gives another common name, what is it?
A.—Horse salts.

Q.—Give the English name for **Sodii Sulphis Exsiccatus**.
A.—Exsiccated Sodium Sulphite.

Q.—Give the chemical formula.
A.—Na_2SO_3.

Q.—How is the salt made?

A.—A convenient method is to pass sulphurous acid gas through a concentrated solution of sodium carbonate until saturated, which forms sodium acid sulphite, to which is added a further quantity of sodium carbonate, to make it neutral. Now the solution is evaporated and crystallized.

Q.—What effect does exposure to the air have on it?

A.—It is slowly oxidized to sulphate.

Q.—What is its solubility?

A.—1 Gm. dissolves in 3.2 mils of water.

Q.—What is it therapeutically?

A.—Antifermentive, and Antiseptic. Dose 1 Gm., or 15 gr.

Q.—What is the synonym for **Sodii Thiosulphas?**

A.—Sodium hyposulphite.

Q.—How pure must it be?

A.—It contains not less than 63.07% nor more than 67.48% of anhydrous sodium thiosulphate, corresponding to not less than 99% of the crystallized salt.

Q.—Give the chemical formula.

A.—$Na_2S_2O_3 + 5H_2O$.

Q.—How is it made?

A.—Made by decomposing calcium thiosulphate, a waste product in the manufacture of other salts, with sodium sulphate or carbonate.

Q.—How does exposure to air affect it?

A.—Permanent at room temperature, efflorescent in dry air above 33° C., deliquescent in moist air.

Q.—What is its solubility?

A.—1 Gm. dissolves in 0.5 mil of water.

Q.—How does boiling affect it?

A.—Tends to decompose it, precipitating sulphur.

Q.—What is it therapeutically?

A.—Antiseptic; dose 1 Gm., or 15 grains.

Q.—Is it ever used externally?

A.—Yes, strong solutions are used in the treatment of poisoning by "poison ivy".

Q.—What commercial use is made of it?
A.—Used largely for bleaching paper and as solvent for silver salts in photography.

Q.—What use is made of it in chemistry?
A.—Used as volumetric solution in analytical work.

N. F. SODIUM SALTS

Q.—How is **Sodii Boro-Benzoas** prepared?
A.—By intimately mixing 43 parts of Borax in fine powder with 57 parts of Sodium Benzoate in fine powder.

Q.—What is it therapeutically?
A.—Antiseptic and diuretic.

Q.—What is the dose?
A.—2 Gm., or 30 gr.

Q.—What is the English name for **Soda cum Calce?**
A.—Soda with Lime.

Q.—What is the synonym?
A.—London Paste.

Q.—How is it made?
A.—By mixing equal weights of Lime and Sodium Hydroxide.

Q.—What is it therapeutically?
A.—Caustic.

Q.—How is it used?
A.—Made into a paste with water, then applied directly to the affected part.

U. S. P. LITHIUM SALTS

Q.—What is the symbol and atomic weight of **Lithium?**
A.—Li; 6.94.

Q.—How does it compare with other metals as to weight?
A.—It is the lightest of all metals.

Q.—What is its specific gravity?
A.—0.5891.

Q.—What Lithium salts are official in the U. S. P.?
A.—The bromide, carbonate, and citrate.

Q.—Does the metal decompose water?

A.—Yes, but the reaction is not so energetic as it is in the case of potassium and sodium.

Q.—How pure must **Lithium Bromide** be?

A.—Must contain not less than 85% of Lithium Bromide.

Q.—What is the chemical formula for it?

A.—LiBr.

Q.—How must it be kept?

A.—In air-tight containers.

Q.—Why must it be so kept?

A.—Because it is very deliquescent.

Q.—How is it made?

A.—There are several methods, (1) reaction between lithium carbonate and hydrobromic acid, (2) reaction between ferrous bromide and lithium carbonate, then evaporation and crystallization.

Q.—What is its solubility?

A.—1 Gm. dissolves in 0.6 mil of water.

Q.—What is it therapeutically?

A.—Sedative nervine, dose 1 Gm., or 15 gr.

Q.—What preparations are official in the N. F.?

A.—Elixir Lithii Bromidi, Syrupus Bromidorum.

Q.—What is the source of **Lithii Carbonas?**

A.—It is separated from lepidolite, a mineral found in nature.

Q.—How pure must it be?

A.—98.5%.

Q.—What is the chemical formula?

A.—Li_2CO_3.

Q.—What can you say of its solubility?

A.—1 Gm. dissolves in 78 mils of water.

Q.—How does this compare in solubility with the other alkali salts?

A.—Only one alkali salt is less soluble than this.

Q.—What effect does exposure to air have on it?

A.—None, it is permanent in air.

Q.—What especial use it made of it in pharmacy?
A.—Most of the lithium salts are made from it.

Q.—What is it therapeutically?
A.—Diuretic, dose 0.5 Gm., or 8 gr.

Q.—In what particular disease is it used?
A.—Gout, where it is reputed to dissolve concretions or deposits at the joints which are said to be the cause of pain.

Q.—Is it probably of any more value than any other diuretic in this direction?
A.—Medical men say it is not.

Q.—How pure must **Lithium Citrate** be?
A.—Not less than 98.5%.

Q.—What is the chemical formula?
A.—$Li_3C_6H_5O_7 + 4H_2O$.

Q.—How is it made?
A.—By decomposing a solution of citric acid with lithium carbonate. The solution is evaporated on a sand or steam-bath and the residue finally dried in an oven at about 115° C.

Q.—How does exposure to the air affect it?
A.—It is deliquescent in moist air.

Q.—What is its solubility?
A.—1 Gm. dissolves in 1.4 mils of water.

Q.—What is it therapeutically?
A.—Diuretic; dose 0.5 Gm., or 8 gr.

Q.—What N. F. preparations are official?
A.—Elixir Lithii Citras, Sal Lithii Citratis Effervescens, Sal Vichyanum Factitium Effervescens cum Lithio.

Q.—What are the "Lithia Tablets" so often called for by the laity for the relief of bladder and urinary troubles?
A.—Tablets of lithium citrate.

Q.—What **N. F. salt of lithium** is official?
A.—**Lithii Salicylas.**

Q.—What is its chemical formula?
A.—$LiC_7H_5O_3$.

Q.—How is it made?

A.—By adding salicylic acid to a mixture of lithium carbonate in boiling water until effervescence ceases, then evaporating to dryness.

Q.—How does exposure to the air affect it?

A.—It is deliquescent in moist air.

Q.—Is it water-soluble?

A.—Yes, very soluble in water.

Q.—What is it therapeutically?

A.—Antirheumatic; dose 1 Gm., or 15 gr.

Q.—What preparation is official?

A.—Elixir Lithii Salicylatis.

Q.—Upon what theory is the use of lithium salts as being superior to those of sodium and potassium in the treatment of gout and rheumatic troubles based?

A.—The old theory was that these troubles were caused by deposits of insoluble urates or acid urates at the joints and that the administration of lithium salts would bring about the formation of normal lithium urate which was more soluble than either sodium or potassium urate and be eliminated with the urine, thus relieving the trouble.

Q.—Is there anything in present day therapeutics to substantiate this theory?

A.—Nothing.

THE ALKALINE EARTH METALS

Q.—Name the metals of the Alkaline Earth group.

A.—Barium, calcium, strontium and magnesium.

Q.—Why are they called the alkaline earth metals?

A.—Because their solutions are alkaline in reaction, and they make up a large portion of the earth's crust.

Q.—Does this mean that they are found free?

A.—No, they occur most largely as compounds, as sulphates, carbonates, phosphates and silicates.

Q.—Is Magnesium always included in this group?

A.—No, some authorities place it in a different classification but it is convenient in pharmacy to have it with this group.

Q.—How are these metals obtained?
A.—Usually by electrolysis of the melted chloride or hydroxide.

Q.—How does exposure to air affect them?
A.—They unite with the oxygen of the air forming oxide which shows as a tarnish.

Q.—How do they react with water?
A.—They decompose water at ordinary temperature forming the hydroxide and releasing hydrogen.

Q.—Do they react with water as energetically as the alkali metals?
A.—No.

Q.—How do they act when burned in the air?
A.—They burn with great brilliancy and form the oxide.

Q.—What is the valence of these metals?
A.—Two in each case.

Q.—What forms when their oxides are dissolved in water?
A.—The hydroxide.

Q.—What can you say of the water-solubility of the carbonates of the alkaline earth metals?
A.—They are all insoluble.

Q.—What can you say of their phosphates?
A.—They are all insoluble.

Q.—What can you say of their sulphates?
A.—They are insoluble, except that of magnesium, which is very soluble in water.

Q.—Give symbol and atomic weight for **Barium.**
A.—Ba; 137.37.

Q.—How is it found in nature?
A.—Occurs as "witherite" which is barium carbonate and as "heavy spar," or "barite" or "barytes" which is barium sulphate.

Q.—How are the other salts of barium made?
A.—By acting on the carbonate with the respective acid or by first converting the sulphate to sulphide, then decomposing the sulphide with the acid.

Q.—Why is the sulphate not decomposed directly by the acid?
A.—Because the sulphate is not attacked by acids.

Q.—Are any salts of barium official?
A.—No.

Q.—Are there any which are used in pharmacy?
A.—Yes, the sulphide, the sulphate, the chloride, the nitrate, the dioxide.

Q.—Are any of the barium salts poisonous?
A.—The soluble ones are poisonous and any of those which can be converted into soluble salts by the acid juices of the stomach.

Q.—What use is made of **Barium Dioxide?**
A.—It is a source of oxygen for making the official solution of hydrogen dioxide.

Q.—What is its chemical formula?
A.—BaO_2.

Q.—What use is made of the chloride?
A.—Its solution is used for the purpose of identifying sulphates.

Q.—How is it used for such identification?
A.—To a solution of the salt which is suspected of being a sulphate, a few drops of barium chloride solution are added and if sulphate is present a white precipitate forms which is insoluble in water or acids.

Q.—What is the chemical formula for barium chloride?
A.—$BaCl_2$.

Q.—What is barytes and what use is made of it in commerce?
A.—It is barium sulphate and it is added to white paint to increase its weight.

Q.—What commercial use is made of barium nitrate?
A.—Used in making fire-works to produce green-colored flame.

Q.—What use is made of the sulphide?
A.—It is made into a paste with water and applied to the skin to remove superfluous hair.

Q.—What name is given to an agent of this kind?
A.—Depilatory.

Q.—Is it poisonous if taken internally?
A.—Yes.

Q.—How might the sulphide be dispensed in error when the sulphate was really wanted?

A.—If the prescription was written for "Barium Sulph".

Q.—What course is to be taken when a prescription of this kind is presented?

A.—The pharmacist must assure himself as to how the salt is to be used, either by consulting the prescriber or as a last resort the patient.

Q.—Is barium sulphate ever given internally?

A.—Yes, it is taken for the purpose of coating the stomach with an insoluble substance so that an x-ray picture can be made showing its outline as an aid in diagnosis.

Q.—Is the element or metal **Calcium** official?

A.—No.

Q.—What is its symbol and atomic weight?

A.—Ca.; 40.07.

Q.—What is its specific gravity?

A.—1.85.

Q.—Is calcium found free in nature?

A.—No, but its compounds are very plentiful.

Q.—What are the commonly found compounds?

A.—The fluoride, carbonate, phosphate, sulphate, and silicate.

Q.—What compounds are official in the U. S. P.?

A.—The bromide, precipitated carbonate, prepared chalk, chloride, glycerophosphate, hypophosphite, lactate, oxide, crude sulphide.

Q.—What N. F. compounds are there?

A.—The lactophosphate and precipitated phosphate.

Q.—What is the Latin title for **Calcium Oxide**?

A.—Calx.

Q.—What are the synonyms?

A.—Lime and quicklime.

Q.—How is it made?

A.—By calcining calcium carbonate.

Q.—What common name is given to calcium carbonate?

A.—Limestone.

Q.—What is the rubric for Lime?

A.—It contains, when freshly ignited to constant weight with a blast lamp, not less than 95% of CaO. It loses not more than 10% of its weight on ignition.

Q.—What is its water-solubility?

A.—1 Gm. dissolves in 840 mils of water.

Q.—Is it more or less soluble in hot water?

A.—Less soluble, requires 1740 mils of boiling water to dissolve 1 Gm. of lime.

Q.—Is it simple solution when the lime dissolves in water?

A.—No, for calcium hydroxide forms.

Q.—How is temperature affected when lime dissolves in water?

A.—The temperature rises.

Q.—How does a solution of lime in water affect litmus?

A.—It turns litmus blue (alkaline).

Q.—What is "milk of lime"?

A.—It is rather a thick mixture of lime and water, chemically calcium hydroxide.

Q.—Why must lime be kept in well-closed containers?

A.—It slowly absorbs moisture from the air and becomes converted to hydroxide.

Q.—Is this the only change which is likely to take place?

A.—No, carbon dioxide may also be taken up which then forms calcium carbonate.

Q.—What preparation is official?

A.—Liquor calcis, limewater.

Q.—What form of **Calcium Bromide** is official?

A.—A hydrated form.

Q.—What is the rubric for it?

A.—It must contain not less than 84% of $CaBr_2$.

Q.—How soluble is it?

A.—1 Gm. dissolves in 0.7 mil water.

Q.—How does exposure to air affect it?

A.—It is very deliquescent.

Q.—How is it made?

A.—By neutralizing hydrobromic acid with calcium carbonate, then evaporating to dryness.

Q.—What is it therapeutically?

A.—Sedative.

Q.—What is the dose?

A.—1 Gm., or 15 gr.

Q.—Name two official forms of Calcium Carbonate.

A.—**Calcii Carbonas Præcipitatus** and **Creta Præparata.**

Q.—How is precipitated Calcium Carbonate made?

A.—By mixing a solution of calcium chloride and a solution of sodium carbonate, then washing the precipitate.

Q.—What is the synonym?

A.—Precipitated chalk.

Q.—Is it crystalline or amorphous?

A.—Crystalline. Micro-crystalline.

Q.—How pure must it be?

A.—99% when dried to constant weight of 200° C.

Q.—What affect does exposure to air have on it?

A.—None, it is permanent in air.

Q.—Is it well adapted for internal use?

A.—No.

Q.—Is it ever given internally?

A.—Yes, it may be.

Q.—What is the dose?

A.—1 Gm., or 15 gr.

Q.—What is the English name for **Creta Præparata?**

A.—Prepared Chalk.

Q.—What is the synonym?

A.—Drop chalk.

Q.—How is it prepared?

A.—By elutriation.

Q.—What is another name for elutriation?

A.—Water sifting.

Q.—How pure must prepared chalk be?

A.—Must contain not less than 97% of calcium carbonate.

Q.—How does it get the name "drop chalk"?
A.—While it is still moist it is formed into small cones by dropping it out of a funnel-shaped apparatus.

Q.—Is it amorphous or crystalline?
A.—Amorphous.

Q.—What use is made of it?
A.—It is used in dentifrices and in internal medicines which are designed to place an insoluble coating over the mucous surfaces of the alimentary tract.

Q.—Why is it better than the precipitated chalk?
A.—Is more adhesive, being amorphous is smoother and not so likely to prove to be irritating.

Q.—What official preparations does it enter?
A.—Pulvis Cretæ Compositus, Mistura Creta, Pulvis Cretæ Aromaticus, Pulvis Cretæ et Opii Aromaticus.

Q.—What is the chemical formula for Calcium Carbonate?
A.—$CaCO_3$.

Q.—What other common substances are forms of calcium carbonate?
A.—Whiting, oystershells, egg shells, marble, limestone.

Q.—What is the chemical formula for **Calcium Chloride?**
A.—$CaCl_2$.

Q.—How is it obtained?
A.—Extensively obtained in a crude form as a by-product in the manufacture of other chemical substances. May be made by decomposing marble with hydrochloric acid and evaporating the resulting solution to dryness.

Q.—How pure must it be?
A.—Must contain not less than 75% of $CaCl_2$.

Q.—How must it be kept?
A.—In well-closed containers.

Q.—Why must it be so kept?
A.—Because it is very deliquescent.

Q.—How soluble is it?
A.—1 Gm. dissolves in 1.2 mils of water.

Q.—What is it therapeutically?
A.—Irritant and resolvent.

Q.—What use is made of it in medicine?
A.—Used to cause coagulation of the blood. Used in the treatment of hay fever.

Q.—What use is made of it in chemistry?
A.—Used as a dehydrating agent.

Q.—What is the dose?
A.—0.5 Gm., or 8 gr.

Q.—How pure must **Calcii Glycerophosphas** be?
A.—Not less than 98%.

Q.—What is the chemical formula?
A.—$C_3H_5(OH)_2PO_4Ca$.

Q.—How is it made?
A.—By neutralizing a solution of glycerophosphoric acid with calcium hydroxide or carbonate, filtering out any calcium phosphate which forms, concentrating the filtrate in a vacuum apparatus and then precipitating the salt with alcohol.

Q.—How does exposure to the air affect it?
A.—It is hygroscopic.

Q.—How soluble is it?
A.—1 Gm. dissolves in 50 mils of water.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.25 Gm., or 4 gr.

Q.—What is the chemical formula for **Calcium Hypophosphite?**
A.—$Ca(PH_2O_2)_2$.

Q.—How is it made?
A.—By treating phosphorus with calcium hydroxide in the form of "milk of lime". The solution is then evaporated until crystallization takes place.

Q.—How pure must it be?
A.—98%.

Q.—What effect does exposure to the air have on it?
A.—None, it is permanent in air. However it is said by some that there is a tendency for it to oxidize by contact with the air and form phosphate.

Q.—What is its water-solubility?
A.—1 Gm. dissolves in 6.5 mils of water.

Q.—What care must be used in dispensing it?
A.—It must not be heated or triturated with nitrates, chlorates or other oxidizing agents, for an explosion is likely to occur.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.5 Gm., or 8 gr.

Q.—What preparations of it are official?
A.—Syrupus Hypophosphitum, Syrupus Hypophosphitum Compositus, Syrupus Calcii et Sodii Hypophosphitum, Syrupus Calcii Hypophosphitis, Liquor Hypophosphitum, Liquor Hypophosphitum Compositus.

Q.—What is the English name for **Calcii Lactas?**
A.—Calcium Lactate.

Q.—How is it made?
A.—By neutralizing a hot solution of lactic acid with calcium carbonate, filtering and setting the filtrate aside to crystallize.

Q.—How pure must it be?
A.—98%.

Q.—What is the chemical formula?
A.—$Ca(C_3H_5O_3)_2 + 5\ H_2O$.

Q.—How does exposure to air affect it?
A.—It is efflorescent.

Q.—How soluble is it?
A.—1 Gm. dissolves in 20 mils of water.

Q.—What is it therapeutically?
A.—Tonic in rickets and scrofula.

Q.—What is the dose?
A.—0.5 Gm., or 8 gr.

Q.—What are the synonyms for **Calcii Sulphidum Crudum?**
A.—Calx Sulphurata, Sulphurated Lime.

Q.—How is it made?
A.—By heating exsiccated calcium sulphate, with starch and charcoal, to redness.

Q.—What is the idea in using starch?
A.—It is to reduce the sulphate to sulphide.

Q.—How pure must it be?
A.—It must contain not less than 55% of CaS.

Q.—What is it therapeutically?
A.—Externally a germicide, internally an alterative.

Q.—What is the dose?
A.—0.06 Gm., or 1 grain.

Q.—What N. F. compounds of calcium are official?
A.—Calcium lactophosphate and precipitated calcium phosphate.

Q.—How does the N. F. define **Calcium Lactophosphate?**
A.—A mixture in variable proportions of calcium lactate, calcium acid lactate and calcium acid phosphate.

Q.—Is it water-soluble?
A.—Yes.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the English name for **Calcii Phosphas Præcipitatus?**
A.—Precipitated Calcium Phosphate.

Q.—Is it water-soluble?
A.—No.

Q.—How is it prepared?
A.—Bone-ash is treated with hydrochloric acid which forms calcium acid phosphate, to this is added calcium chloride and ammonia water, this precipitates the normal phosphate.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—1 Gm., or 15 grains.

Q.—What pharmaceutical use is made of it?
A.—Used as a filtering medium.

Q.—Is it well adapted for this purpose?
A.—No, it is too soluble in the presence of acid.

Q.—Is Calcium Sulphate official?
A.—No.

Q.—What are two other names for calcium sulphate?
A.—Gypsum and Plaster of Paris.

Q.—What is the differenc between them?
A.—Gypsum contains more water of crystallization than plaster of Paris.

Q.—Why is it called plaster of Paris?
A.—Because it is largely manufactured in the neighborhood of Paris.

Q.—What property makes plaster of Paris valuable?
A.—When water is added to it, it "sets" or becomes very hard.

Q.—What use is made of it in medical practice?
A.—Used in making bandages to hold fractured bones in place after having been set.

Q.—How is it used as a rat poison?
A.—It is mixed with flour upon which the rat feeds, then after drinking water, the plaster hardens in the stomach.

STRONTIUM AND SALTS

Q.—What is the symbol and atomic weight of **Strontium?**
A.—Sr.; 87.63.

Q.—Is the metal official?
A.—No.

Q.—How does it occur in nature?
A.—Principally as the carbonate and sulphate.

Q.—What salts are official?
A.—The carbonate in the N. F. and the bromide, iodide and salicylate in the U. S. P.

Q.—What is the chemical formula for **Strontii Bromidum?**
A.—$SrBr_2 + 6H_2O$.

Q.—How is it made?
A.—By neutralizing a solution of hydrobromic acid with strontium carbonate, then concentrating the solution until the salt crystallizes.

Q.—What effect does exposure to the air have on it?
A.—Deliquescent in moist air but efflorescent in very dry air.

Q.—How soluble is it?
A.—1 Gm. dissolves in 0.35 mil of water.

Q.—What is it therapeutically?
A.—Sedative nervine, dose 1 Gm. or 15 gr.

Q.—Why is it said to be preferred to other bromides?
A.—It is less irritant to the stomach.

Q.—How pure must the salt be?
A.—Not less than 98%.

Q.—What is the chemical formula for **Strontii Iodidum?**
A.—$SrI_2 + 6H_2O$.

Q.—How pure must it be?
A.—Not less than 99%.

Q.—How must it be kept?
A.—In small amber-colored, glass-stoppered bottles, carefully protected from the light.

Q.—Why must it be so kept?
A.—Because light and air decompose it, liberating iodine.

Q.—How is it made?
A.—By neutralizing a solution of hydriodic acid with strontium carbonate, then evaporating the solution until the salt crystallizes.

Q.—Is it deliquescent or efflorescent?
A.—Deliquescent.

Q.—How soluble is it?
A.—1 Gm., dissolves in 0.2 mil of water.

Q.—What is it therapeutically?
A.—Alterative. Dose 0.3 Gm. or 5 gr.

Q.—Why do some physicians prefer it to the other iodides?
A.—Because it is less likely to cause iodism.

Q.—What is the chemical formula for **Strontii Salicylas?**
A.—Sr $(C_7H_5O_3)_2 + 2H_2O$.

Q.—How pure must it be?
A.—Not less than 99%.

Q.—How is it made?
A.—By neutralizing strontium carbonate with a hot, concentrated solution of salicylic acid, then evaporating the solution until the salt crystallizes out.

Q.—How soluble is it?
A.—1 Gm. dissolves in 19 mils of water.

Q.—What is it therapeutically?
A.—Antiseptic, antirheumatic.

Q.—What is the dose?
A.—1 Gm. or 15 gr.

Q.—How pure must **Strontium Carbonate** be?
A.—Not less than 99%.

Q.—What is the source of it?
A.—It is found in nature as strontianite, also it may be made by precipitation by mixing solutions of sodium carbonate and a soluble strontium salt.

Q.—What is the principal use made of this salt?
A.—Largely used for making the other strontium salts.

Q.—How soluble is it?
A.—Insoluble.

Q.—Into what N. F. preparation does it enter?
A.—Compound Elixir of Formates.

Q.—What commercial use is made of **Strontium Nitrate?**
A.—Used to produce red color in fire works.

MAGNESIUM AND ITS SALTS

Q.—What is the chemical formula and atomic weight of **Magnesium?**
A.—Mg.; 24.32.

Q.—Is the element official?
A.—No.

Q.—How does it occur in nature?

A.—It is not found free but many compounds are found, as "magnesite" or magnesium carbonate, "dolomite" or magnesium and calcium carbonate, "kieserite" or magnesium sulphate, "carnallite" or magnesium and potassium chloride, also as magnesium silicate in the form of talcum, asbestos, meerschaum, etc.

Q.—What salts of Magnesium are official?

A.—The carbonate, oxide, heavy oxide and sulphate in the U. S. P. and the chloride in the N. F.

Q.—How does the U. S. P. define **Magnesii Carbonas?**

A.—A mixture of hydrated magnesium carbonate and magnesium hydroxide corresponding to not less than 39.2% MgO and containing not more than 0.8% of CaO.

Q.—How is it prepared?

A.—It may be prepared from "dolomite," a natural double carbonate of magnesium and calcium, but it is probably more often prepared by precipitation from solutions of magnesium sulphate and sodium carbonate.

Q.—What is the probable chemical formula for the official carbonate?

A.—$4MgCO_3.Mg(OH)_2$.

Q.—What is the difference between the light and heavy carbonates?

A.—In preparing the light carbonate, cold and dilute solutions are used for precipitation, for the heavy carbonate hot and concentrated solutions are used.

Q.—What effect does exposure to the air have on it?

A.—None, it is permanent.

Q.—Is it water-soluble?

A.—No.

Q.—If it is not soluble how can it impart an alkaline reaction to water?

A.—The magnesium hydroxide which the carbonate contains is sufficiently soluble to give an alkaline reaction.

Q.—May magnesium carbonate be used as a filtering or clarifying agent?

A.—This depends entirely upon the nature of the solution to be filtered or clarified. If the liquid is to be used as a vehicle

or solvent for inorganic salts or alkaloidal salts, it **must not** be used for the liquid will be found alkaline enough to precipitate alkaloids and there will be sufficient magnesium in solution to react with inorganic salts. On the other hand some preparations are the better for being filtered through an alkaline medium, it may influence color in some instances and solubility in others.

Q.—What is it therapeutically?
A.—Antacid and in large doses laxative.

Q.—What is the dose?
A.—3 Gm. or 45 grains.

Q.—Give the official titles for the two forms of Magnesium Oxide.
A.—Magnesii Oxidum and Magnesii Oxidum Ponderosum.

Q.—What are the synonyms for **Magnesium Oxide**?
A.—Magnesia, Calcined Magnesia, Light Magnesia.

Q.—Is the Oxide invariably sold when Magnesia is asked for?
A.—No, when tobacco users ask for "Magnesia" to relieve "heart-burn" the carbonate in blocks is commonly sold.

Q.—Why is it called "calcined" magnesia?
A.—Because it is prepared by the process of calcination.

Q.—How is the official salt prepared?
A.—By exposing the carbonate in crucibles to a red heat.

Q.—By what other name is it sometimes called?
A.—Magnesia usta or ustum.

Q.—Why is it so-called?
A.—Because of the Latin word meaning "burned".

Q.—How pure must it be?
A.—Not less than 96%.

Q.—What is the limit of Calcium Oxide permitted?
A.—Not more than 2%.

Q.—What is the limit of water which it may contain?
A.—Not to exceed 10%.

Q.—How must it be kept?
A.—In well-closed containers.

Q.—Why must it be so kept?

A.—Because it absorbs moisture and carbon dioxide and is converted to the carbonate and hydroxide.

Q.—What can you say of its solubility?

A.—Practically insoluble in water, insoluble in alcohol.

Q.—What is it therapeutically?

A.—Antacid and laxative.

Q.—What is the dose?

A.—2 Gm. or 30 grains.

Q.—What is the English title for **Magnesii Oxidum Ponderosum?**

A.—Heavy Magnesium Oxide.

Q.—What is the synonym?

A.—Heavy Magnesia.

Q.—Is the rubric any different from that of Magnesium Oxide?

A.—No.

Q.—Is this produced the same as the Light Oxide?

A.—In the same manner, but the heavy carbonate is used while in making the light oxide, the light carbonate is used.

Q.—What physical difference is there between the two oxides?

A.—The heavy oxide has only about ¼ the bulk of the light when equal weights are taken.

Q.—Which is preferable when given internally?

A.—The action is the same and the bulk of the dose may be much smaller if the heavy is used.

Q.—What action is to be avoided when dispensing magnesium oxide?

A.—It should not be triturated with pressure.

Q.—Why is this?

A.—It deprives it of its property of diffusing through liquids.

Q.—In what particular is the light oxide better than the heavy?

A.—It is a better absorbent.

Q.—In what class of preparations is it used for this purpose?

A.—The Extracts.

Q.—Into what preparations does the light oxide enter?

A.—Ferri Hydroxidum cum Magnesii Oxido; Pulvis Rhei Compositus. **Massa Copaibæ.**

Q.—What N. F. Preparation does the heavy oxide enter?

A.—Pulvis Rhei et Magnesiæ Anisatus.

Q.—Is the dose or therapeutic property any different in case of the heavy oxide than the light oxide?

A.—No.

Q.—What is the synonym for **Magnesii Sulphas**?

A.—Epsom Salt.

Q.—By what other names is it sometimes called?

A.—Bitter salts and English salts.

Q.—How is it prepared?

A.—By treating magnesium hydroxide with sulphuric acid; the mixture is heated to red heat and then mixed with calcium sulphide to remove any iron impurity.

Q.—Is that the only source of the salt?

A.—No, it is also obtained as a by-product, when "magnesite," a form of magnesium carbonate, is decomposed with sulphuric acid, to obtain carbon dioxide in preparing carbonated waters.

Q.—What is the chemical formula of the official salt?

A.—$MgSO_4 + 7\ H_2O$.

Q.—How pure must it be?

A.—Not less than 99.5% of the crystallized salt.

Q.—What effect does exposure to the air have on it?

A.—It is efflorescent.

Q.—How soluble is it?

A.—1 Gm. dissolves in 1 mil of water.

Q.—What is it therapeutically?

A.—A hydragogue cathartic.

Q.—What objection has been raised to using it?

A.—It has a very disagreeable taste.

Q.—How is it used?

A.—Dissolved in water and taken as a draught.

Q.—What methods are offered to make it less objectionable?
A.—A little lemon juice may be added to the solution; the mouth may be rinsed with a little diluted vinegar just before taking; if the solution is made with ice-cold water it is less disagreeable; the granular effervescing salt is less disagreeable.

Q.—What U. S. P. preparation does it enter?
A.—Infusum Sennæ Compositum.

Q.—What N. F. preparations are official?
A.—Liquor Magnesii Sulphatis Effervescens, and it also enters a number of the artificial salts.

Q.—What is the dose?
A.—15 Gm. or 4 drachms.

Q.—Is it ever used as a toilet preparation?
A.—Yes, a saturated solution is made and this applied to the skin, the water evaporates and leaves the salt on the skin as a very fine, white powder.

Q.—What magnesium salt is official in the N. F.?
A.—**Magnesii Chloridum.**

Q.—What is the chemical formula?
A.—$MgCl_2 + 6\ H_2O$.

Q.—How is it prepared?
A.—Ordinarily obtained from the double salt, potassium and magnesium chloride, called "carnallite." A solution is made, then evaporated to the point where magnesium chloride crystallizes out.

Q.—How pure must it be?
A.—95% of the crystallized salt.

Q.—What effect does exposure to the air have on it?
A.—Deliquescent in moist air.

Q.—How soluble is it?
A.—1 Gm. dissolves in 0.6 mil of water.

Q.—What is it therapeutically?
A.—Purgative.

Q.—What is the dose?
A.—15 Gm., or 4 drachms.

Q.—What N. F. preparation does it enter?
A.—Liquor Hydrastinæ Compositus.

Q.—Give the definition for **Talcum Purificatum?**

A.—A purified native hydrous magnesium silicate, sometimes containing a small amount of aluminum silicate.

Q.—What is it used for in pharmacy?

A.—As a filtering or clarifying medium.

Q.—By what other names is it called?

A.—French chalk and soapstone.

Q.—What impurities are removed in the process of purification?

A.—Magnesium carbonate, aluminum and iron.

Q.—Why is it a particularly good filtering or clarifying agent?

A.—Because it is insoluble in any kind of liquid and does not absorb active constituents from solution.

Q.—Does this mean that other filtering media are likely to do this?

A.—Yes, precipitated calcium phosphate is slightly soluble in acid liquids, magnesium carbonate is somewhat soluble in ordinary liquids, and kieselguhr is likely to absorb active constituents from the filtering liquids.

ALUMINUM AND COMPOUNDS

Q.—Give the symbol and atomic weight of **Aluminum?**

A.—Al.; 27.1.

Q.—Is the element official?

A.—No.

Q.—Does it occur free in nature?

A.—No.

Q.—How does it occur?

A.—In combination, most commonly as a silicate in the form of clay or rock.

Q.—Give some of the names of the precious stones and useful minerals which are aluminum oxide?

A.—Ruby, sapphire, corundum and emery.

Q.—What can you say of the specific gravity of the metal?

A.—It is quite light, the specific gravity being about 2.65.

Q.—Why is aluminum of value in making the small weights for prescription scales?

A.—It is light, hence the weights may be made quite large and are then more easily handled than those made from the heavier metals, which must be smaller.

Q.—What other uses are made of the metal?

A.—It has great strength combined with lightness, hence may be made into scientific instruments, flying machines, cooking utensils, opera glasses and many other instruments where strength and lightness are desirable.

Q.—Is the statement that food cooked in an aluminum vessel is likely to be contaminated with poisonous aluminum salts true to any degree?

A.—No, not in the least.

Q.—What compounds of Aluminum are official in the U. S. P.?

A.—Aluminum and potassium or ammonium sulphate, both crystalline and exsiccated and aluminum hydroxide.

Q.—What is the official Latin title for aluminum and potassium or ammonium sulphate?

A.—**Alumen.**

Q.—What is the English title?

A.—Alum.

Q.—What is the rubric or definition for it?

A.—It contains not less than 99.5% of $AlNH_4(SO_4)_2+12H_2O$, or of $AlK(SO_4)_2+12H_2O$, the label of the container must indicate whether it is Ammonium Alum or Potassium Alum.

Q.—How is it made?

A.—May be made from a clay which is aluminum silicate containing iron sulphide, this sulphide when the clay is calcined furnishes sulphur for sulphuric acid and converts the aluminum to aluminum sulphate to which ammonium or potassium sulphate may be added. A solution of the double salt is then made to crystallize.

Q.—Which is more common in the market, ammonium or potassium alum?

A.—Ammonium alum because it is cheaper.

Q.—How can one tell whether a sample is ammonium or potassium alum?

A.—By the regular chemical tests. To solution of the salt add a few drops of NaOH T. S. and if it is ammonium alum, the odor of ammonia will be given off. The potassium alum may be identified by the flame test; a well-cleaned platinum wire dipped into a solution of the salt, then held in a colorless flame imparts the characteristic lavender color to the flame.

Q.—Which of the Alums is the more soluble?

A.—The potassium alum.

Q.—How soluble is the potassium alum?

A.—1 Gm. dissolves in 7.2 mils of water.

Q.—How soluble is the ammonium alum?

A.—1 Gm. dissolves in 9 mils of water.

Q.—How does a solution of alum in water react toward indicators?

A.—It is acid.

Q.—What is alum therapeutically?

A.—Astringent and emetic.

Q.—What is the dose?

A.—0.5 Gm. or 8 gr.

Q.—What U. S. P. compounds are made from it?

A.—Exsiccated alum and aluminum hydroxide.

Q.—What N. F. preparations does it enter?

A.—Solution of aluminum acetico-tartrate and cochineal color.

Q.—Is **Alumen Exsiccatum** made from ammonium or potassium alum?

A.—It may be made from either, but the label of the container must show which it is.

Q.—What are the synonyms?

A.—Alumen Ustum, Dried Alum, Burnt Alum.

Q.—How is it prepared?

A.—The alum in fine pieces is placed in a porcelain dish and heated carefully until it liquefies, then the heat is continued at not above 200° C, with constant stirring until no more watery vapors are given off. The residue is finely powdered and kept in tightly-stoppered containers.

Q.—How much moisture may it contain?
A.—Not to exceed 10%.

Q.—Why must care be taken in limiting the temperature when preparing dried alum?
A.—A higher temperature is likely to convert it to the oxide or basic sulphate of aluminum.

Q.—How much exsiccated alum may be made from the crystalline?
A.—55%.

Q.—Is it more or less soluble than the crystalline?
A.—Much less soluble.

Q.—What use is made of it?
A.—It is used as a mild caustic or escharotic in fungus granulations (proud flesh) and as a stimulant to sluggish ulcers.

Q.—What is "aqua plagiari"?
A.—A mixture made by boiling together, alum, compound tincture of benzoin and water, used locally to arrest hemorrhage.

Q.—What is meant by the term "alum" as applied to chemical substances?
A.—A compound which contains an atom of a trivalent element and a monovalent element united with two sulphate radicles and having 12 molecules of water of crystallization.

Q.—Is it necessary that the compound contain aluminum to be classed as an alum?
A.—No.

Q.—Give an example of an alum which does not contain aluminum?
A.—Ferric-ammonium alum. $FeNH_4(SO_4)_2+12H_2O$.

Q.—What is the chemical formula for **Alumini Hydroxidum?**
A.—$Al(OH)_3$.

Q.—How is it prepared?
A.—By reaction between a solution of alum and a solution of monohydrated sodium carbonate.

Q.—Why is sodium carbonate used and not sodium hydroxide?
A.—Because aluminum is such a weak base that the sodium hydroxide would cause the formation of sodium aluminate instead of aluminum hydroxide.

Q.—Why then by the official process does not aluminum carbonate form?

A.—Possibly it does momentarily but the salt is such a weak combination that it is immediately broken up by hydrolysis.

Q.—Why are such large quantities of water used in making the solutions of alum and sodium carbonate?

A.—So that the precipitate will be light and bulky.

Q.—Why is the alum solution poured into the carbonate solution and not the reverse?

A.—To cause the formation of the hydroxide with as little contamination of sulphate as possible, so there will be less difficulty in washing the hydroxide free from those salts.

Q.—What is the cause of the considerable effervescence when the alum solution is poured into the carbonate solution?

A.—The alum solution is distinctly acid to indicators because of the weakness of the base aluminum as compared with the strength of sulphuric acid.

Q.—Is aluminum hydroxide ever given internally?

A.—No.

Q.—What use is made of it?

A.—It is used as a dusting powder because of its drying, astringent and antacid properties.

Q.—What N. F. sàlts of aluminum are official?

A.—The chloride and the sulphate.

Q.—What is the chemical formula for **Alumini Chloridum?**

A.—$AlCl_3 + 6H_2O$.

Q.—How is it made?

A.—By reaction between solutions of barium chloride and aluminum sulphate, then crystallizing the resulting solution of aluminum chloride.

Q.—What is taken as the standard of purity?

A.—The quantity of aluminum oxide which it will yield.

Q.—What must be the purity of the official aluminum chloride?

A.—It must yield not less than 20.5% of aluminum oxide.

Q.—How does exposure to the air affect it?

A.—It is deliquescent.

Q.—What is its solubility?
A.—1 Gm. dissolves in 0.5 mil water.

Q.—What is it therapeutically?
A.—Astringent and antiseptic.

Q.—What N. F. preparation does it enter?
A.—Liquor Hydrastinæ Compositus.

Q.—What is the most popular use made of it today?
A.—Used in solution as perspiration deodorant and preventative.

Q.—How are these made and applied?
A.—Ordinarily about a 25% solution in distilled water and applied directly to the part every two or three days.

Q.—What is the internal dose of the salt?
A.—0.3 Gm. or 5 gr.

Q.—What is the chemical formula for **Alumini Sulphas**?
A.—$Al_2(SO_4)_3 + 16 H_2O$.

Q.—How may it be made?
A.—By dissolving the freshly made aluminum hydroxide in diluted sulphuric acid, then evaporating the solution until it crystallizes.

Q.—How pure must it be?
A.—Not less than 99.5%.

Q.—What effect does exposure to the air have on it?
A.—None, it is permanent in the air.

Q.—How soluble is it?
A.—1 Gm. dissolves in 1 mil of water.

Q.—What is it therapeutically?
A.—Astringent and antiseptic.

Q.—What N. F. preparations does it enter?
A.—Liquor Alumini Acetatis, Liquor Alumini Subacetatis and Liquor Zinci et Alumini Compositus.

Q.—What salt of Cerium is official?
A.—**Cerium Oxalate, Cerii Oxalas.**

Q.—Is it a pure salt?
A.—No.

Q.—What is the official definition?
A.—A mixture of the oxalates of cerium, didymium, lanthanum and other associated metals.

Q.—What is the explanation for this not being a pure salt?
A.—These metals have so nearly the same reactions that it is impossible to separate them by any ordinary means.

Q.—What is the source of most of our Cerium Oxalate?
A.—A by-product in the production of thorium which is largely used in the making of gas-mantles.

Q.—What is it therapeutically?
A.—Antiemetic, used to allay persistent vomiting.

Q.—What is the dose?
A.—0.2 Gm.

Q.—What can you say of its solubility?
A.—Insoluble in water, alcohol, ether and cold acids.

Q.—What salt of **Chromium** is official?
A.—**Chromium Trioxide,** Chromii Trioxidum.

Q.—What are the synonyms?
A.—Chromic acid, chromic anhydride.

Q.—What is its purity?
A.—Not less than 95% CrO_3.

Q.—How must it be kept?
A.—In glass-stoppered bottles.

Q.—What caution is directed in its use?
A.—Must not be brought in contact with organic substances as serious accidents are likely to occur.

Q.—Describe it.
A.—Needle-shaped crystals, metallic luster, purplish-red color, very deliquescent.

Q.—What is its solubility?
A.—Soluble in 0.6 mil of water.

Q.—What happens when in contact with organic solvents?
A.—Explosion is likely to occur.

Q.—Is water an organic solvent?
A.—No.

Q.—How may one distinguish an organic solvent?
A.—By the Carbon atoms in its chemical formula.

Q.—What use is made of Chromium Trioxide?
A.—Used as an escharotic.

Q.—Is the metal **Zinc** official?
A.—Yes.

Q.—What is its Latin title?
A.—Zincum.

Q.—What is its required purity?
A.—99%.

Q.—What is its specific gravity?
A.—6.9 when cast to 7.2 when rolled.

Q.—How may it be dissolved?
A.—By the use of diluted sulphuric or hydrochloric acid.

Q.—Does this mean that the concentrated acids will not dissolve it?
A.—Yes.

Q.—How does heat affect the metal?
A.—From 100° to 150°C it becomes ductile, at 200°C it becomes so brittle that it may be powdered, at 413°C it melts.

Q.—What use is made of it in testing?
A.—Used in Marsh's test for Arsenic, where it is mixed with hydrochloric acid to cause an evolution of hydrogen.

Q.—How is Zinc found in nature?
A.—Usually as the sulphide, called zinc blend.

Q.—What action do air and moisture have on it?
A.—The zinc loses its luster and a coating of ZnO and $ZnCO_3$ forms which quite effectively protects the rest of the metal from attack.

Q.—What principal use is made of the metal in the industries?
A.—Used for galvanizing iron products which it protects from rust as indicated in the above answer.

Q.—What is the purity of **Zinc Acetate**?
A.—Not less than 83.16% nor more than 87.32% of anhydrous zinc acetate, corresponding to not less than 99.5% of the crystallized salt containing 2 molecules of water of crystallization.

Q.—What is the solubility?
A.—Dissolves in 2.3 mils of water, 30 mils of alcohol.

Q.—What is its odor?
A.—Acetous.

Q.—What is its taste?
A.—In dilute solution, astringent, metallic.

Q.—How does exposure to air affect it?
A.—Effloresces and loses some of its acid.

Q.—How does its solution affect litmus?
A.—Neutral or slightly acid.

Q.—How is the salt made?
A.—By dissolving ZnO in Acetic acid $ZnO + 2\ HC_2H_3O_2 = Zn(C_2H_3O_2)_2 + H_2O$.

Q.—What is the salt therapeutically?
A.—A mild astringent.

Q.—What is the dose?
A.—0.125 Gm.

Q.—How does the U. S. P. define **Zinci Carbonas Præcipitatus?**
A.—Precipitated Zinc Carbonate is of somewhat variable composition, corresponding to not less than 68% of ZnO.

Q.—How is it prepared?
A.—Reaction between hot solutions of $ZnSO_4$ and Na_2CO_3.

Q.—Can this be looked upon as being a true carbonate?
A.—No, for it always contains some $Zn(OH)_2$.

Q.—What can you say of its solubility?
A.—Insoluble in water and alcohol.

Q.—In what form is it found in commerce?
A.—As a white impalpable powder.

Q.—How does exposure to the air affect it?
A.—Has no effect on it.

Q.—What use is made of it?
A.—Chiefly as a dusting-powder.

Q.—What is it therapeutically?
A.—Slightly astringent.

Q.—How pure must **Zinci Chloridum** be?
A.—Not less than 95% $ZnCl_2$.

Q.—How must it be stored?
A.—In small glass-stoppered bottles.

Q.—How does exposure to the air affect it?
A.—Causes it to liquefy.

Q.—What is its solubility?
A.—Dissolves in 0.25 mil of water, 1.3 alcohol.

Q.—How does the solution affect litmus?
A.—Turns it red.

Q.—Is the salt poisonous?
A.—Yes.

Q.—What is the antidote?
A.—MgO or sodium bicarbonate.

Q.—What is the salt used for?
A.—Antiseptic, disinfectant and caustic. Most always an ingredient of embalming fluids.

Q.—Is it ever given internally?
A.—No.

Q.—What U. S. P. preparation is official?
A.—Liquor Zinci Chloridi.

Q.—What is Burnett's disinfecting solution?
A.—A well known solution, said to contain about 13 Gm. of zinc chloride to each 30 mils.

Q.—What is the chemical formula for **Zinci Oxidum?**
A.—ZnO.

Q.—How is it made?
A.—By calcining zinc carbonate.

Q.—How pure must it be?
A.—99%.

Q.—What effect does exposure to the air have on it?
A.—It absorbs carbon dioxide.

Q.—What is its solubility?
A.—Insoluble in water or alcohol.

Q.—Is it ever given internally?

A.—It may be, but is not generally looked upon as being a remedy for internal administration.

Q.—What is the size of the internal dose?

A.—From 0.06 to 0.3 Gm., although the U. S. P. does not give a dose.

Q.—What is it therapeutically?

A.—Astringent.

Q.—What U. S. P. preparation is official?

A.—Unguentum Zinci Oxidi.

Q.—Are there any N. F. preparations?

A.—Yes, several including glycerogelatins, pastes, mulls and ointment.

Q.—What is the synonym for **Zinci Phenolsulphonas**?

A.—Zinc Sulphocarbolate.

Q.—What is the chemical formula?

A.—$Zn(C_6H_5O.SO_3)_2 + 8\ H_2O$.

Q.—How is it made?

A.—By reaction between solutions of zinc sulphate and barium phenolsulphonate. Barium sulphate is precipitated and filtered off. The solution of zinc phenolsulphonate is concentrated and crystallized.

Q.—How pure must it be?

A.—Must contain not less than 77.4% of the anhydrous salt corresponding to not less than 99.5% of the crystalline salt.

Q.—How does exposure to the air affect it?

A.—It is deliquescent and when exposed to both light and air may become slightly pink.

Q.—What is its solubility?

A.—1 Gm. dissolves in 1.6 mils of water.

Q.—What is it therapeutically?

A.—Intestinal antiseptic, artringent and stimulant.

Q.—What is the dose?

A.—0.125 Gm. or 2 gr.

Q.—Is **Zinci Stearas** a definite chemical compound?

A.—Evidently not as the U. S. P. does not give a chemical formula for it.

Q.—How does the U. S. P. define it?
A.—A compound of zinc with stearic acid and small but variable proportions of palmitic acid, containing an amount of zinc corresponding to not less than 13% nor more than 15.5% of ZnO.

Q.—How is it prepared?
A.—Sodium stearate is first made by reaction between monohydrated sodium carbonate and stearic acid, then a dilute solution of zinc acetate is added to the sodium stearate solution, and zinc stearate precipitates out.

Q.—Is it soluble?
A.—No, insoluble in water, alcohol or ether.

Q.—What is it therapeutically?
A.—Astringent.

Q.—What use is made of it?
A.—Used as a drying, dusting powder.

Q.—Is there an official preparation?
A.—Yes, unguentum zinci stearatis.

Q.—What is the chemical formula for **Zinci Sulphas?**
A.—$ZnSO_4 + 7 H_2O$.

Q.—How is it made?
A.—Reaction between metallic zinc or zinc oxide and diluted sulphuric acid.

Q.—What is the common name for it?
A.—White vitriol.

Q.—How pure must it be?
A.—99.5% of the crystallized salt.

Q.—What effect does exposure to the air have on it?
A.—Efflorescent in dry air.

Q.—How soluble is it?
A.—1 Gm. dissolves in 0.6 mil of water.

Q.—What is it therapeutically?
A.—Astringent, tonic and emetic.

Q.—What is the dose?
A.—1 Gm. or 15 gr.

Q.—Would this be considered an emetic dose?
A.—Yes.

Q.—What is the synonym for **Zinci Valeras?**
A.—Zinc valerianate.

Q.—How is it made?
A.—Reaction between solutions of sodium valerate and zinc sulphate. The less soluble zinc valerate collects on the surface of the mixture, an instance of the rather unusual "upward precipitation".

Q.—What is the chemical formula for the salt?
A.—$Zn(C_5H_9O_2)_2 + 2\ H_2O$.

Q.—What effect does exposure to the air have on it?
A.—It slowly loses valeric acid and becomes insoluble.

Q.—How soluble is it?
A.—1 Gm. dissolves in 70 mils of water.

Q.—What is it therapeutically?
A.—Nerve tonic and antispasmodic.

Q.—What is the dose?
A.—0.125 Gm. or 2 gr.

Q.—What preparation is official?
A.—Elixir Zinci Valeratis.

Q.—What N. F. compound of zinc is official?
A.—**Calamina Præparata.**

Q.—What is the synonym?
A.—Lapis Calaminaris.

Q.—How is it defined?
A.—Native zinc carbonate containing a varying amount of zinc silicate, calcined at a moderate temperature; or calcined zinc carbonate, containing a small amount of ferric oxide.

Q.—What color is it?
A.—Pinkish.

Q.—What is the color due to?
A.—To the small amount of iron present.

Q.—Is it water soluble?
A.—No.

Q.—What is it therapeutically?
A.—A mild astringent.

Q.—What preparation is official?
A.—Unguentum Calaminæ.

Q.—What unofficial preparation is much used?
A.—Calamine lotion.

MANGANESE AND COMPOUNDS

Q.—What is the symbol and atomic weight of Manganese?
A.—Mn; 54.93.

Q.—Is the element official?
A.—No.

Q.—How is it found in nature?
A.—As the carbonate and as several forms of the oxide, called "pyrolusite," "braunite" and "hausmanite."

Q.—What U. S. P. salt is official?
A.—**Mangani Dioxidum Præcipitatum.**

Q.—What is the chemical formula for it?
A.—MnO_2.

Q.—What is used in making it?
A.—Manganese sulphate, ammonia water and solution of hydrogen dioxide.

Q.—Why is the solution of hydrogen dioxide used?
A.—To oxidize the manganese from a valence of two to a valence of four.

Q.—What color is the salt?
A.—Black.

Q.—Is it soluble?
A.—No, neither in water nor alcohol.

Q.—What effect does exposure to the air have on it?
A.—No effect.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.25 Gm. or 4 gr.

Q.—What N. F. salts of Manganese are official?
A.—Mangani Citras Solubilis, Mangani Glycerophosphas Solubilis, Mangani Hypophosphas, Mangani Sulphas.

Q.—What is the synonym for **Soluble Manganese Citrate?**
A.—Manganese and sodium citrate.

Q.—How is it defined?
A.—Manganous citrate rendered soluble by the aid of sodium citrate. It corresponds, when dried to constant weight at 120°C, to not less than 49% nor more than 51% of $Mn_3(C_6H_5O_7)_2$. Preserve in well closed containers.

Q.—What is its solubility?
A.—1 Gm. dissolves in 4 mils of water.

Q.—In what form is it found in the market?
A.—In a powder or in translucent scales.

Q.—What is it therapeutically?
A.—Tonic and alterative.

Q.—What is the dose?
A.—0.2 Gm. or 3 gr.

Q.—What is the synonym for **Mangani Glycerophosphas Solubilis?**
A.—Soluble Manganous Glycerinophosphate.

Q.—What is the official definition?
A.—Manganous Glycerophosphate rendered soluble by the aid of citric acid. It contains not less than 70% nor more than 75% of $MnC_3H_7PO_6$. Preserve it in well closed containers.

Q.—How soluble is it?
A.—1 Gm. dissolves in 4 mils of water.

Q.—What is it therapeutically?
A.—Nerve tonic and alterative.

Q.—What is the dose?
A.—0.2 Gm. or 3 gr.

Q.—What preparation is official?
A.—Elixir Glycerophosphatum Compositum.

Q.—What is the chemical formula for **Manganese Hypophosphite?**
A.—$Mn(PH_2O_2)_2$.

Q.—How is it made?
A.—May be prepared by reaction between manganese carbonate and hypophosphorous acid and crystallizing from hot aqueous solution.

Q.—How soluble is it?
A.—Freely soluble in water.

Q.—What effect does exposure to air have on it?
A.—No effect, it is permanent.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.2 Gm. or 3 gr.

Q.—What preparations does it enter?
A.—Liquor Hypophosphitum Compositus and Syrupus Hypophosphitum Compositus.

Q.—What is the color of the salt?
A.—Pink.

Q.—How is **Manganese Sulphate** defined?
A.—It contains not more than 38% of water and not less than 62% nor more than 68% of $MnSO_4$.

Q.—How is it made?
A.—Manganese dioxide is heated with charcoal, the cold residue is treated with sulphuric acid.

Q.—How soluble is it?
A.—1 Gm. dissolves in 1 mil of water.

Q.—What effect does exposure to the air have on it?
A.—Slightly efflorescent.

Q.—What is it therapeutically?
A.—Tonic and chologogue.

Q.—What is the dose?
A.—0.2 Gm. or 3 gr.

IRON AND COMPOUNDS

Q.—What is the symbol and atomic weight of **Iron?**
A.—Fe.; 55.84.

Q.—Is the element official?
A.—Yes.

Q.—Is the element official in more than one form?
A.—Yes, in two forms.

Q.—What are they?
A.—Ferrum, fine bright nonelastic wire, and Ferrum Reductum.

Q.—What "trade" name is given to the official iron wire?
A.—Card teeth.

Q.—Is iron found free in nature?
A.—Yes, in rather limited quantities.

Q.—In what compounds is it found?
A.—Hematite or ferric oxide, "magnetite" or loadstone or ferroso-ferric oxide, "limonite" or hydrated ferric oxide, spathic iron ore or "siderite" or ferrous carbonate, iron pyrites or ferrous sulphide.

Q.—What is the English name for **Ferrum Reductum**?
A.—Reduced iron.

Q.—What are the synonyms?
A.—Ferrum redactum, iron by hydrogen, Quevenne's iron.

Q.—Why is it called Quevenne's iron?
A.—After the French pharmacist who discovered the process for making it.

Q.—Why is it called iron by hydrogen?
A.—Because it is made by the action of hydrogen on another form or compound of iron.

Q.—How is it made?
A.—Ferric hydroxide is first dried, which converts it to ferric oxide. The oxide is placed in an iron tube and through this tube a stream of hydrogen is passed, this unites with the oxygen of the oxide forming water and deposits the metallic iron.

Q.—How pure must it be?
A.—It must contain not less than 90% of metallic iron.

Q.—What effect does exposure to air have on it?
A.—None, it is permanent in air.

Q.—Is it soluble?
A.—No, neither in water nor alcohol.

Q.—What impurities may be present in iron?
A.—Iron sulphides and ferric arsenide.

Q.—In what valences does iron exist?
A.—Two and three.

Q.—What English words are used to indicate the valence of iron compounds?

A.—Ferrous for those in which the valence is two, ferric for those in which the valence is three.

Q.—What is the valence of the iron in those compounds having the Latin title "ferri" as Ferri Chloridum?

A.—The Latin word Ferri does not indicate what the valence is, for it is the genitive form of the word Iron, hence gives no clue to valence.

Q.—What is the characteristic color of all ferrous compounds and preparations?

A.—Green.

Q.—What is the characteristic color of ferric compounds and preparations?

A.—Generally brown, but may be yellowish or red.

Q.—Are there no ferric compounds which are green?

A.—Yes, there are one or two but this is an exception and not the rule.

Q.—What ferrous compounds are official?

A.—Ferrous lactate in the N. F. and ferrous sulphate in the U. S. P.

Q.—What is the synonym for **Ferrous Sulphate?**

A.—Iron Protosulphate.

Q.—What does "proto" mean?

A.—First.

Q.—What two common names are frequently applied to ferrous sulphate?

A.—Green vitriol, and copperas.

Q.—What is the chemical formula for it?

A.—$FeSO_4 + 7\ H_2O$.

Q.—How is it made?

A.—By acting on metallic iron with dilute sulphuric acid, the solution which must be acid in reaction is evaporated and the salt allowed to crystallize out.

Q.—Why must the solution be distinctly acid when it is evaporated?

A.—Because a strictly neutral solution when heated in the air will oxidize.

Q.—How pure must it be?
A.—99.5% of the crystallized salt.

Q.—What effect does exposure to air have on it?
A.—Efflorescent in dry air. Moist air rapidly oxidizes it.

Q.—What indicates such oxidation?
A.—The yellowish-brown color of the crystals.

Q.—Is such oxidized salt fit for use in official preparations?
A.—No.

Q.—What is the solubility of the salt?
A.—1 Gm. dissolves in 1.4 mils of water.

Q.—What other forms of Ferrous Sulphate are official?
A.—Ferri Sulphas Exsiccatus and Ferri Sulphas Granulatus.

Q.—What is the synonym for **Exsiccated Ferrous Sulphate?**
A.—Dried Ferrous Sulphate.

Q.—How is it prepared?
A.—By allowing the crystallized salt to effloresce in dry air at 40° C. then heating on the water-bath.

Q.—What is the color of the exsiccated salt?
A.—Grayish-white.

Q.—What is the dose of the dried salt?
A.—0.06 Gm. or 1 gr.

Q.—What is the synonym for **Granulated Ferrous Sulphate?**
A.—Precipitated Ferrous Sulphate.

Q.—How is it prepared?
A.—A supersaturated solution of ferrous sulphate is made with boiling water, sulphuric acid and ferrous sulphate. The solution is filtered and evaporated to about 60% of its original weight, then cooled and rapidly stirred. The mass is filtered through a pledget of cotton, as soon as the water is filtered off, alcohol is sprinkled on the crystals, then they are quickly dried on filter paper.

Q.—Why is alcohol poured on the crystals?
A.—Alcohol takes up the water very rapidly, so the crystals need not be exposed to air so long in drying.

Q.—Why is it objectionable to have them exposed to the air?
A.—The oxygen of the air tends to oxidize the crystals to ferric iron.

Q.—What is the object in having this form of salt official?
A.—The process of recrystallization makes a purer product.

Q.—Does it contain less water of crystallization?
A.—No.

Q.—What is ferrous sulphate therapeutically?
A.—Tonic, astringent and disinfectant.

Q.—What is the dose?
A.—0.1 Gm. 1½ gr.

Q.—What pharmaceutical use is made of ferrous sulphate?
A.—When ferrous carbonate is to be made, or when ferric sulphate is to be prepared, it is used because it is a soluble ferrous salt.

Q.—Name two unofficial ferrous salts of which there are several preparations.
A.—Ferrous carbonate and ferrous iodide.

Q.—Name the U. S. P. preparations of Ferrous Carbonate.
A.—Massa Ferri Carbonatis, Pilulæ Ferri Carbonatis, Ferri Carbonas Saccharatus.

Q.—Name an N. F. preparation of ferrous carbonate.
A.—Mistura Ferri Composita.

Q.—What U. S. P. preparations of Ferrous Iodide are official?
A.—Pilulæ Ferri Iodidi, Syrupus Ferri Iodidi.

Q.—What N. F. preparation contains it?
A.—Syrupus Ferri et Mangani Iodidi.

Q.—What N. F. ferrous salt is official?
A.—**Ferrous Lactate.**

Q.—How is it made?
A.—Reaction between solutions of calcium lactate and ferrous sulphate, the calcium sulphate being removed by alcohol. It may also be made by acting on iron wire with lactic acid, then filtering, concentrating and crystallizing.

Q.—What is the chemical formula?
A.—$Fe\ (C_3H_5O_3)_2 + 3\ H_2O$.

Q.—How pure must it be?
A.—97%.

Q.—In what two forms does it appear in commerce?
A.—In crystalline crusts and in crystalline powder.

Q.—Which is the better for pharmaceutical use?
A.—The crusts.

Q.—Why are the crusts better?
A.—They are likely to be purer, that is not so much ferric salt present.

Q.—How soluble is it?
A.—1 Gm. dissolves in 40 mils of water.

Q.—What preparation of it is official?
A.—Elixir Ferri Lactatis.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.3 Gm. or 5 gr.

Q.—Name two salts of ferrous iron which are unofficial but of which there are official preparations in the N. F.
A.—Ferrous Chloride, Crude Malate of Iron.

Q.—What preparations of ferrous chloride are official?
A.—Liquor Ferri Protochloridi, Syrupus Ferri Protochloridi.

Q.—What preparation of malate of iron is official?
A.—Extractum Ferri Pomatum.

Q.—What ferric salt is official in the U. S. P.?
A.—**Ferric Chloride.**

Q.—What are the synonyms for it?
A.—Iron Perchloride, Sesquichloride of Iron.

Q.—How is it made?
A.—By evaporating the official solution of ferric chloride on a water-bath to about 40% of its weight then setting aside in a covered container to crystallize.

Q.—What is the chemical formula for it?
A.—$FeCl_3$.

Q.—How does the U. S. P. define it?
A.—A hydrated form of $FeCl_3$ corresponding to not less than 20% of iron.

Q.—What effect does exposure to the air have on it?
A.—Deliquescent.

Q.—How soluble is it?
A.—1 Gm. dissolves in 0.2 mil of water.

Q.—What other solvents will dissolve it readily?
A.—Alcohol and glycerin.

Q.—What is it therapeutically?
A.—Tonic and astringent.

Q.—What is the dose?
A.—0.06 Gm. or 1 gr.

Q.—Where is **Ferri Hypophosphis** official?
A.—In the N. F.

Q.—What is the chemical formula?
A.—$Fe(PH_2O_2)_3$.

Q.—How pure must it be?
A.—98% of the salt corresponding to not less than 21.8% of iron.

Q.—How is it made?
A.—Reaction between solutions of sodium hypophosphite and ferric-ammonium alum.

Q.—What effect does exposure to the air have on it?
A.—None, it is permanent in air.

Q.—What is its solubility?
A.—Insoluble in water. 1 Gm. dissolves in 2300 mils.

Q.—What means is used to get it into solution in making its preparations?
A.—An alkaline citrate, as potassium citrate induces solubility.

Q.—What effect does strong heat have on it?
A.—Converts it to the pyrophosphate.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.2 Gm. or 3 gr.

Q.—What preparations does it enter?
A.—Syrupus Hypophosphitum Compositus, Syrupus Ferri Hypophosphitis, Liquor Ferri Hypophosphitis, Liquor Hypophosphitum Compositus.

Q.—What scale salts of iron are official?

A.—Ferri et Ammonii Citras, Ferri et Quininæ Citras, Ferri Phosphas, Ferri Glycerophosphas, Ferri Pyrophosphas.

Q.—Tell in a general way how the scale salts are made.

A.—First Ferric Hydroxide is prepared in the regular manner, then it is dissolved in the required salt to make the desired finished product, e.g. citric acid for ferric citrate, this solution is then evaporated to a syrupy consistence on the water-bath and the syrupy liquid spread on glass plates to dry and scale.

Q.—What are the synonyms for **Ferri et Ammonii Citras?**

A.—Soluble Ferric Citrate, Ammonio-ferric Citrate.

Q.—Why is the ammonium citrate present?

A.—To make the ferric citrate more readily soluble.

Q.—How much iron must the salt contain?

A.—Not less than 16% nor more than 18%.

Q.—Why must it be protected from the light?

A.—Light tends to reduce it to the ferrous condition.

Q.—What effect does exposure to the air have on it?

A.—It is deliquescent, it will lose ammonia and become less soluble.

Q.—How can the solubility be restored?

A.—By the careful addition of ammonia water.

Q.—How soluble is it?

A.—It is readily soluble and completely so.

Q.—What is the color of the salt?

A.—Garnet-red.

Q.—What is it therapeutically?

A.—Hematinic.

Q.—Why is it preferable to many other iron salts?

A.—It is almost entirely free from astringency.

Q.—What is the dose?

A.—0.25 Gm. or 4 grains.

Q.—What is the synonym for **Ferri et Quininæ Citras?**

A.—Soluble iron and quinine citrate.

Q.—How is it made?

A.—The quinine alkaloid is dissolved in a solution of ferric citrate with the addition of some citric acid, then adding to this

solution ammonia water just as long as the precipitate formed redissolves, great care being taken to avoid an execss of ammonia water. The solution is then concentrated and scaled in the manner already stated.

Q.—How much quinine does it contain?
A.—Not less than 11.5%.

Q.—How much iron does it contain?
A.—Not less than 13%.

Q.—What is the color of the salt?
A.—Greenish or golden-yellow.

Q.—What effect does exposure to the air have on it?
A.—Deliquescent.

Q.—Is it water-soluble?
A.—Readily so.

Q.—What is it therapeutically?
A.—Tonic and hematinic.

Q.—What is the dose?
A.—0.25 Gm. or 4 gr.

Q.—What preparation does it enter?
A.—Bitter wine of iron.

Q.—What preparation does Iron and Ammonium Citrate enter?
A.—Wine of iron.

Q.—What is the synonym for **Ferri Phosphas?**
A.—Soluble ferric phosphate.

Q.—How is it made?
A.—Reaction between solutions of ferric citrate and sodium phosphate, the resulting mixture is concentrated and scaled in the usual manner.

Q.—Why do good scales fail to form sometimes?
A.—It may be that the liquid is not sufficiently concentrated or too much heat is used in drying.

Q.—What kind of sodium phosphate is to be used in making the salt?
A.—Only the uneffloresced crystals.

Q.—Why is this so?
A.—Too much of the sodium salt causes the scales to become white and opaque.

Q.—What is the color of the scales?
A.—Bright green.

Q.—What effect does exposure to the air have on the scales?
A.—Causes them to discolor.

Q.—Is the salt water-soluble?
A.—Yes, readily so.

Q.—How much iron must the scales contain?
A.—Not less than 12%.

Q.—Are the scales of definite chemical composition?
A.—No, the composition varies.

Q.—What is the dose?
A.—0.25 Gm. or 4 gr.

Q.—What preparation is official?
A.—Elixir Ferri Phosphatis.

Q.—How is **Ferri Glycerophosphas** prepared?
A.—By dissolving freshly precipitated ferric hydroxide in a solution of glycerophosphoric acid, evaporating and scaling.

Q.—How much iron must the salt contain?
A.—Not less than 14% nor more than 16%.

Q.—What is the color of the scales?
A.—Yellowish-green.

Q.—How soluble is the salt?
A.—1 Gm. dissolves slowly in 2 mils of water.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.2 Gm. or 3 gr.

Q.—What preparation does it enter?
A.—Elixir Glycerophosphatum Compositum.

Q.—What is the synonym for **Ferri Pyrophosphas?**
A.—Soluble Ferric Pyrophosphate.

Q.—How is it made?
A.—By adding sodium pyrophosphate to a solution of ferric citrate. The solution is then concentrated and spread on glass plates.

Q.—How much iron must it contain?
A.—Not less than 10%.

Q.—What is the color of the scales?
A.—Apple-green.

Q.—How does light affect it?
A.—Discolors it.

Q.—Is it water-soluble?
A.—Yes, completely so.

Q.—What is it therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—0.25 Gm. or 4 gr.

Q.—What preparation does it enter?
A.—Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ, Elixir Ferri Pyrophosphatis.

MERCURY AND ITS COMPOUNDS

Q.—What is the symbol and atomic weight of **Mercury**?
A.—Hg.; 200.6.

Q.—What is the Latin name for it?
A.—Hydrargyrum.

Q.—Is it official?
A.—Yes.

Q.—What is the synonym?
A.—Quicksilver.

Q.—What is the nature of the element?
A.—It is a liquid.

Q.—Is there any other official liquid element?
A.—Yes, one other one, Bromine.

Q.—Does mercury occur free in nature?
A.—Yes, but in limited quantities.

Q.—What is the most common natural compound?
A.—Mercuric Sulphide.

Q.—What is the common name for this compound?
A.—Cinnabar.

Q.—What color is it?
A.—Red.

Q.—Where is it found?
A.—California, Spain and Austria.

Q.—How is the mercury obtained from the compound?
A.—Simply by heating it at rather high temperatures, the metal does not readily combine with oxygen but sulphur does, forming SO_2.

Q.—How may it be purified?
A.—By forcibly straining through chamois and distilling in vacuum.

Q.—How pure must the official mercury be?
A.—99.5%.

Q.—What is its specific gravity?
A.—13.5 at 25°C.

Q.—What is its boiling point?
A.—358°C.

Q.—At what temperature does it solidify?
A.—40° below zero.

Q.—Is it readily soluble?
A.—No, insoluble in all ordinary solvents and most acids.

Q.—What acids will dissolve it?
A.—Nitric and boiling sulphuric acid.

Q.—How may impurities be readily detected in mercury?
A.—By letting it roll over white paper, it will leave no marks unless there are impurities in it.

Q.—Is it ever used in medicine?
A.—No, not by itself.

Q.—What preparations are official?
A.—Hydrargyrum cum Creta, Massa Hydrargyri, Ungt. Hydrargyri, Ungt. Hydrargyri Dilutum, Petroxolinum Hydrargyri.

Q.—Why is it used in thermometers?
A.—Because it responds so readily and evenly to changes in temperature by expansion and contraction and because it will measure most temperatures without boiling or freezing.

Q.—What two classes of compounds does it form?
A.—Mercurous and mercuric.

Q.—What is the valence of mercury in mercurous compounds?
A.—One.

Q.—What is it in mercuric compounds?
A.—Two.

Q.—What marked differences are there between the two classes of compounds?
A.—The mercurous are less soluble and less poisonous.

Q.—What is regarded as the largest safe does of a mercuric salt?
A.—About 0.005 Gm. or $\frac{1}{12}$ gr.

Q.—What is to be done in case of poisoning by mercuric salts?
A.—An emetic should be given to get as much as possible of the unassimilated salt out of the stomach. Then milk or white of egg may be given to form an insoluble salt which in turn is to be removed by an emetic.

Q.—What other treatment has been recommended?
A.—Give sodium phosphite with the hope that it will be oxidized to sodium phosphate at the expense of the mercuric salt which will itself be reduced to a mercurous salt and not poisonous. Sodium acetate is also given at the same time to act as a diuretic and keep the kidneys flushed.

Q.—What is meant by "salivation?"
A.—A condition which results in some people from the use of mercury preparations or salts. It causes an excessive flow of saliva, the mouth and gums become swollen and sore. In some cases it is so severe that the lower jaw bone is destroyed.

Q.—What is to be done in such cases?
A.—Of course the mercury is to be discontinued. The use of a saturated solution of potassium chlorate as a mouth-wash and gargle will frequently help.

Q.—What is meant by an "amalgam"?
A.—A solution of a metal in mercury.

Q.—Name the official mercurous salts.
A.—Hydrargyri Chloridum Mite. Hydrargyri Iodidum Flavum.

Q.—Give the synonyms for **Mild Mercurous Chloride.**

A.—Mercurous Chloride, Calomel, Protochloride of Mercury, Subchloride of Mercury.

Q.—By what other names is it sometimes called?

A.—Aquila alba. Healing Powder. Submuriate of Mercury.

Q.—How is it made?

A.—Mercuric sulphate is first made by reaction between hot sulphuric acid and mercury. From this mercurous sulphate is made by rubbing the same weight of free mercury with the mercuric sulphate as was used to produce the mercuric sulphate. The mercurous sulphate is then mixed with sodium chloride and the mixture is heated, when the calomel sublimes and the sodium sulphate, not being volatile, remains in the retort.

Q.—How pure must it be?

A.—99.6%.

Q.—What is the chemical formula for Calomel?

A.—HgCl.

Q.—Is it ever written Hg_2Cl_2?

A.—Yes, but the mercury and chloride radicle are in the same proportion in either case.

Q.—Why then is it sometimes written Hg_2Cl_2?

A.—Because in determining the molecular weight, it is said that the results seem to point out that there are two atoms of mercury and two atoms of chlorine in the molecule of mercurous chloride.

Q.—What can you say of its solubility?

A.—It is insoluble in any of the common solvents and insoluble in cold dilute acids.

Q.—What can you say of its color and taste?

A.—It is white and tasteless.

Q.—What happens when it is triturated with strong pressure?

A.—It becomes yellowish-white?

Q.—What gives the yellow color?

A.—It is said that the heat of friction and presence of oxygen of the air causes the formation of minute particles of yellow oxide of mercury.

Q.—How would you detect mercuric chloride as an impurity in calomel?

A.—Put the calomel on a filter in a funnel and pour on hot water. This will dissolve the mercuric chloride, then pass hydrogen sulphide into the filtrate when black mercuric sulphide will separate if mercuric chloride has been present in the calomel. Or to the filtrate may be added a few drops of sodium hydroxide T. S. and yellow mercuric oxide will form if mercuric chloride has been present.

Q.—What is it therapeutically?
A.—Alterative and laxative.

Q.—What is the dose?
A.—As an alterative 0.015 Gm., as a laxative 0.15 Gm.

Q.—What U. S. P. preparation does it enter?
A.—Compound Cathartic Pills.

Q.—What N. F. preparations does it enter?
A.—Lotio Nigra: Pilulæ Antimonii Compositæ. Pulvis Hydrargyri Chloridi Mitis et Jalapæ. Trochisci Santonini Compositi.

Q.—Is the dose of the Pharmacopeia ever exceeded?
A.—Yes, very largely at times.

Q.—Is poisoning likely to result?
A.—No, because the salt is so very insoluble.

Q.—Is it ever used externally?
A.—Yes, as a dusting powder in some forms of ulcers.

Q.—When given internally, in what form is it commonly administered?
A.—Powders or tablet triturates.

Q.—Should it ever be given in compressed tablets or pills?
A.—No, the action is brought about by the fine state of division, and pills and compressed tablets are quite likely to pass through the alimentary canal without disintegrating.

Q.—Why is sodium bicarbonate frequently given with it?
A.—It is supposed by some to make the calomel more active and by others to lessen the probability of the calomel being changed to mercuric chloride in the stomach.

Q.—Is it of any value in either case?
A.—Pharmacologists say it is not.

Q.—Is a single large dose commonly given?
A.—No, more often small doses from $\frac{1}{10}$ to $\frac{1}{4}$ gr. frequently repeated until from 1 gr. to 3 gr. are taken.

Q.—What is the cause of the black spots in some tablets of sodium bicarbonate and calomel?
A.—A reduction of some of the calomel to free mercury.

Q.—What effect does lime water or other alkaline hydroxide have on calomel?
A.—Causes it to turn black.

Q.—What care is to be observed in dispensing calomel in prescriptions?
A.—To see that no other ingredient in the prescription is likely to convert it to mercuric chloride.

Q.—Does this condition often occur?
A.—No.

Q.—Is there any danger of calomel being converted into mercuric chloride in the stomach?
A.—No.

Q.—Give the synonyms for **Yellow Mercurous Iodide.**
A.—Mercurous iodide, Protiodide of mercury, Yellow iodide of mercury.

Q.—By what other name is it called?
A.—Green iodide.

Q.—How can it be green?
A.—Because some free mercury separates from the iodide and this is bluish-white which with the original yellow makes a green.

Q.—How is it made?
A.—By pouring a solution of potassium iodide into a solution of mercurous nitrate, then drying the resulting precipitate in the dark.

Q.—How pure must it be?
A.—99%.

Q.—What is the chemical formula?
A.—HgI.

Q.—Is it water-soluble?
A.—No.

Q.—What color is it?
A.—Bright yellow.

Q.—What effect does exposure to light have on it?
A.—Decomposes it into metallic mercury and mercuric iodide.

Q.—What is it therapeutically?
A.—Alterative.

Q.—What is the dose?
A.—0.01 Gm. or 1/6 gr.

Q.—Is it ever used externally?
A.—Yes, sometimes prescribed in the form of an ointment for syphilitic ulcers.

Q.—What are the synonyms for **Hydrargyri Chloridum Corrosivum?**
A.—Bichloride of Mercury. Corrosive Sublimate. Mercuric Chloride, Perchloride of Mercury.

Q.—How is it made?
A.—By mixing mercuric sulphate and sodium chloride, then subjecting the mixture to a temperature sufficiently high to cause the mercuric chloride to sublime, the sodium sulphate which also forms does not sublime.

Q.—How pure must it be?
A.—99.5%.

Q.—Is it water-soluble?
A.—Yes, 1 Gm. dissolves in 13.5 mils of water.

Q.—Is it alcohol soluble?
A.—Yes, dissolves more readily in alcohol than water.

Q.—What effect does exposure to the air have on it?
A.—None, it is permanent.

Q.—What is it therapeutically?
A.—Internally it is alterative, externally it is antiseptic and germicide.

Q.—What is the dose?
A.—0.003 Gm. or 1/20 gr.

Q.—Is it ever given hypodermically?
A.—Never alone.

Q.—Why is it never used alone hypodermically?
A.—Because it unites with the albumen of the tissues to form an insoluble mercuric albuminate.

Q.—What is done to prevent this?
A.—Sodium chloride is added.

Q.—What preparations are official?
A.—Toxitabellae Hydrargyri Chloridi Corrosivi, Mulla Hydrargyri Chloridi Corrosivi.

Q.—What effect does an alkaline hydroxide have on it?
A.—Forms the yellow mercuric oxide.

Q.—Give the synonyms for **Hydrargyri Iodium Rubrum.**
A.—Biniodide of Mercury, Mercuric Iodide, Red Iodide of Mercury.

Q.—How is it made?
A.—By pouring together solutions of mercuric chloride and potassium iodide, taking care to have neither in excess when mixing. Then washing the precipitate with cold distilled water.

Q.—Why must there be neither an excess of iodide nor chloride when they are being mixed?
A.—Because the mercuric iodide is soluble in either an excess of potassium iodide or mercuric chloride.

Q.—Is mercuric iodide soluble in water?
A.—No.

Q.—Is it soluble in the other solvents?
A.—Only slightly so, 115 mils of alcohol, 910 mils of chloroform, 120 mils of ether.

Q.—What will dissolve it readily?
A.—Solutions of the soluble iodides, mercuric chloride, sodium thiosulphate, and hot solutions of the alkali chlorides.

Q.—What is it therapeutically?
A.—Antisyphilitic and alterative.

Q.—What is the dose?
A.—0.003 Gm. or $\frac{1}{20}$ gr.

Q.—What preparations are official?

A.—Liquor Arseni et Hydrargyri Iodidi, Liquor Hydrargyri et Potassii Iodidi.

Q.—What is the synonym for **Hydrargyrum Ammoniatum?**

A.—White Precipitate.

Q.—What is the official English name?

A.—Ammoniated Mercury.

Q.—What is the chemical formula for it?

A.—$HgNH_2Cl$.

Q.—What is the rubric or definition for it?

A.—It contains mercurammonium chloride corresponding to not less than 78% nor more than 80% of mercury. Preserve it in well-closed containers, protected from the light.

Q.—How is it made?

A.—By filtering a solution of mercuric chloride into ammonia water, being careful to have a slight excess of ammonia water at all times.

Q.—Is it soluble in water?

A.—No.

Q.—In washing ammoniated mercury to free it from ammonium chloride what care is to be used?

A.—To use a minimum amount of water with a little ammonia water, for if too much water is used the salt will be decomposed into a yellow basic salt.

Q.—Is it ever given internally?

A.—No.

Q.—How is it used?

A.—Generally in the form of an ointment.

Q.—Is such an ointment official?

A.—Yes, Unguentum Hydrargyri Ammoniati, 10%.

Q.—What is it therapeutically?

A.—Parasiticide.

Q.—What troubles are treated with it?

A.—Some forms of eczema, ringworm, and barber's itch.

Q.—How many oxides of mercury are official?

A.—Two.

Q.—Are they mercuric or mercurous?
A.—Both are mercuric.

Q.—What are the titles?
A.—Hydrargyri Oxidum Flavum and Hydrargyri Oxidum Rubrum.

Q.—What is the real difference between the two?
A.—The yellow is amorphous and more finely divided and reflects the yellow rays of light. The red is crystalline, larger particles and reflects the red rays of light.

Q.—What effect does heating have on the yellow?
A.—Turns it red.

Q.—What effect does heating to 400° C., have on the red?
A.—Turns it dark violet or almost black, but it assumes its original red color on cooling.

Q.—What is the English name for **Hydrargyri Oxidum Flavum**?
A.—Yellow Mercuric Oxide.

Q.—How is it made?
A.—By filtering a solution of mercuric chloride into a solution of sodium hydroxide, and collecting the precipitate.

Q.—What causes the precipitate to assume a brown color at times?
A.—An oxychloride of mercury forms due to an excess of mercuric chloride or a lack of strength in the sodium hydroxide.

Q.—Why is the precipitate washed with hot, distilled water?
A.—It is washed to remove sodium chloride which is a by-product, but hot water is directed so that any undecomposed mercuric chloride will be more readily dissolved out.

Q.—How pure must it be?
A.—99.5%.

Q.—What is the chemical formula?
A.—HgO.

Q.—What effect does exposure to light have on it?
A.—Causes it to turn dark.

Q.—Is it soluble in water or alcohol?
A.—No, in neither.

Q.—What will dissolve it?
A.—Diluted hydrochloric or nitric acids.

Q.—What is it therapeutically?
A.—Alterative and antiparasitic.

Q.—Is it ever given internally?
A.—No.

Q.—How is it used?
A.—Almost always in the form of an ointment.

Q.—What preparation is official?
A.—Unguentum Hydrargyri Oxidi Flavi.

Q.—What other compound of mercury is made from it?
A.—Oleate of Mercury.

Q.—Where is the ointment of the yellow oxide largely used?
A.—By ophthalmologists in the treatment of "granulated" eye-lids.

Q.—What is the synonym for **Hydrargyri Oxidum Rubrum?**
A.—Red Precipitate.

Q.—How is it made?
A.—By first heating metallic mercury with nitric acid and evaporating this to dryness, then further heating the mercuric nitrate until it decomposes to form mercuric oxide according to the following equation $2Hg(NO_3)_2 + heat = 2HgO + 4NO_2 + O_2$.

Q.—How pure must it be?
A.—99.5%.

Q.—What preparation is official?
A.—Unguentum Hydrargyri Oxidi Rubri.

Q.—Why is this ointment less desirable than that of the yellow oxide?
A.—Because it is almost impossible to reduce the crystals to an impalpable powder and a gritty ointment is decidely objectionable.

Q.—Is it ever given internally?
A.—No.

Q.—What is the synonym for **Hydrargyri Salicylas?**
A.—Mercuric Subsalicylate.

Q.—How is it made?

A.—A dilute solution of mercuric chloride is mixed with a dilute solution of sodium hydroxide, to form mercuric oxide, then the oxide is boiled with a little water and salicylic acid until the mixture is quite white.

Q.—How does the U. S. P. define it?

A.—A compound of mercury and salicylic acid containing not less than 54% nor more than 59.5% of mercury. Preserve it in well-closed containers protected from the light.

Q.—Is it always found in the market as a white powder?

A.—No, it may be slightly yellowish or pinkish.

Q.—Is it water-soluble?

A.—No.

Q.—What is it therapeutically?

A.—Antiseptic and antisyphilitic.

Q.—What is the dose?

A.—0.004 Gm. or $\frac{1}{15}$ gr.

Q.—How is it administered?

A.—Usually hypodermically with light liquid petrolatum or oil. The mixture should of course be sterilized before being injected.

LEAD AND ITS COMPOUNDS

Q.—What is the symbol and atomic weight of **lead?**

A.—Pb.; 207.10.

Q.—Why is Pb used as the symbol?

A.—The letters are derived from the Latin name for lead which is Plumbum.

Q.—Is the metallic element official?

A.—No.

Q.—How is it found in nature?

A.—It occurs most extensively as Lead Sulphide, commonly called galena.

Q.—How is the metal obtained?

A.—By roasting the "galena".

Q.—What is the specific gravity of lead?

A.—11.37.

Q.—Are the lead salts poisonous?
A.—Those that are soluble are poisonous.

Q.—Might water drawn through lead pipes be poisonous?
A.—Yes.

Q.—Explain how it might be poisonous.
A.—Water containing a little carbon dioxide will dissolve small but appreciable quantities of lead, forming the hydroxide and carbonate which are slightly soluble.

Q.—Why is it then that more people are not poisoned by drinking water drawn through lead pipes?
A.—Chlorides and sulphates are almost always present in water and these form insoluble coatings over the metal and thus prevents the formation of soluble salts.

Q.—What salts of lead are official in the U. S. P.?
A.—Plumbi Acetas and Plumbi Oxidum.

Q.—What is the synonym for **Plumbi Acetas?**
A.—Sugar of Lead.

Q.—How is it made?
A.—By gently heating a mixture of lead oxide and acetic acid.

Q.—How pure must it be?
A.—99.5% of the crystalline salt.

Q.—Give the chemical formula.
A.—$Pb(C_2H_3O_2)_2 + 3H_2O$.

Q.—Is it water-soluble?
A.—Yes, 1 Gm. dissolves in 1.4 mils of water.

Q.—What effect does exposure to air have on it?
A.—It is efflorescent and absorbs carbon dioxide which makes it less soluble.

Q.—Why is it called "sugar of lead"?
A.—Because of its sweet taste.

Q.—Is it poisonous?
A.—Yes.

Q.—What is the antidote?
A.—Give a solution of sodium sulphate or magnesium sulphate.

Q.—How does this act as an antidote?
A.—It reacts with the soluble lead salt to form the insoluble lead sulphate which may then be removed from the stomach by an emetic.

Q.—What is it therapeutically?
A.—Sedative and astringent.

Q.—Is it ever given internally?
A.—Yes.

Q.—What is the dose?
A.—0.06 Gm. or 1 gr.

Q.—What are its official preparations?
A.—Liquor Plumbi Subacetatis, Lotio Plumbi et Opii, Pilulæ Plumbi et Opii.

Q.—What is the synonym for **Plumbi Oxidum?**
A.—Litharge.

Q.—What is the chemical formula?
A.—PbO.

Q.—Is this the only oxide that lead will form?
A.—No, it forms five oxides.

Q.—How is the salt formed?
A.—By heating lead in the air. The commercial supply comes largely from a process of separating lead from an ore which also contains silver.

Q.—How pure must it be?
A.—Contain not less than 96% PbO.

Q.—Is it water-soluble?
A.—No.

Q.—What effect does exposure to the air have on it?
A.—It absorbs moisture and carbon dioxide.

Q.—Is it ever given internally?
A.—No.

Q.—What use is made of it in the drug store?
A.—It is made into a paste with glycerin and used as a cement for fastening pestle handles. Heat will not soften this as it will the mixture of rosin and yellow wax which is so commonly used.

Q.—What preparations does it enter?
A.—Emplastrum Plumbi, Liquor Plumbi Subacetatis.

Q.—Name the N. F. compounds of lead.
A.—Plumbi Carbonas, Plumbi Iodidum, Plumbi Oxidum Rubrum.

Q.—What is the synonym for **Plumbi Carbonas?**
A.—White Lead.

Q.—How is it made?
A.—May be made by adding a solution of sodium bicarbonate to a solution of lead nitrate and collecting the precipitate.

Q.—What is the largest use made of Lead Carbonate?
A.—It is the white lead used in paints.

Q.—Is this white lead made in the manner above outlined?
A.—No, lead is subjected to the action of dilute acetic acid and converted into basic lead acetate. This is then acted upon by carbon dioxide.

Q.—What is the chemical formula for the commercial lead carbonate?
A.—The formula is somewhat variable but it is said to be $2PbCO_3.Pb(OH)_2$.

Q.—Why is it used as a paint in preference to many other white minerals?
A.—It is very opaque and has good covering qualities.

Q.—What disadvantage does it have as a white paint?
A.—The hydrogen sulphide in the air unites with it to form black lead sulphide.

Q.—Is Lead Carbonate ever used as a toilet preparation?
A.—Yes, it is used under the name of "pearl white" as a powder and as a lotion.

Q.—Is it objectionable?
A.—Yes, for if its use is persisted in enough lead will be absorbed to cause lead poisoning.

Q.—Give the chemical formula for **Plumbi Iodidum.**
A.—PbI_2.

Q.—How is it made?
A.—By pouring together solutions of potassium iodide and lead nitrate, then collecting the precipitate and washing free from potassium nitrate.

Q.—What color is it?
A.—Bright yellow.

Q.—Is it water-soluble?
A.—No, 1 Gm. requires 1200 mils of water for solution.

Q.—Is it ever given internally?
A.—No.

Q.—How is it used?
A.—Generally in the form of an ointment.

Q.—Is such an ointment official?
A.—Yes, 10%.

Q.—What is it therapeutically?
A.—Stimulant to indolent ulcers.

Q.—What is the English name for **Plumbi Oxidum Rubrum?**
A.—Red Oxide of Lead.

Q.—What is the synonym?
A.—Red Lead. (Minium; Paris red; sandix.)

Q.—What is the chemical name for it?
A.—Lead Orthoplumbate.

Q.—What is the chemical formula?
A.—Pb_2PbO_4.

Q.—How is it obtained?
A.—By heating lead carbonate or lead monoxide in the air to a temperature not exceeding 450° C.

Q.—What color is it?
A.—Orange-red.

Q.—Is it water-soluble?
A.—No.

Q.—Is it ever given internally?
A.—No.

Q.—Into what preparation does it enter?
A.—Emplastrum Fuscum Camphoratum, and through this into Unguentum Fuscum.

COPPER AND ITS SALTS

Q.—What is the symbol and atomic weight of **Copper?**
A.—Cu.; 63.57.

Q.—Is it official?
A.—No.

Q.—Is copper found free in nature?

A.—Yes, to some extent. It is found in Michigan, Japan, and China.

Q.—What natural compounds of it are found?

A.—Chalcopyrite $CuFeS_2$, Chalcocite Cu_2S, Bornite Cu_3FeS_3 Cuprite Cu_2O, Melaconite CuO, Malachite $CuCO_3.Cu(OH)_2$.

Q.—What is its specific gravity?

A.—8.9.

Q.—What compound of Copper is official?

A.—**Cupri Sulphas.**

Q.—What is the chemical formula?

A.—$CuSO_4 + 5H_2O$.

Q.—What is the synonym?

A.—Cupric Sulphate.

Q.—What are the common names?

A.—Blue vitriol, blue stone.

Q.—How is it made?

A.—May be made by reaction between cupric oxide and dilute sulphuric acid, then crystallizing. On a commercial scale it is obtained by oxidizing the native copper sulphide.

Q.—What is the color of the salt?

A.—Deep blue.

Q.—Is it water-soluble?

A.—Yes, 1 Gm. dissolves in 2.5 of mils of water.

Q.—What color is the salt when deprived of its water of crystallization?

A.—White.

Q.—Does it regain its blue color in the presence of water?

A.—Yes.

Q.—What use is made of this property?

A.—Used to test alcohol for the presence of water.

Q.—How is it used?

A.—Copper sulphate is insoluble in alcohol, so if the anhydrous salt which is white is added to alcohol it will take on a blue color if there is as much as 3% of water in the alcohol.

Q.—What effect does exposure to the air have on copper sulphate?
A.—Effloresces.

Q.—What is it therapeutically?
A.—Minute doses are tonic and astringent, larger doses are emetic.

Q.—Is it ever used externally?
A.—Yes, as a mild escharotic. Much used in veterinary practice for removing "proud flesh" from wounds.

Q.—What is the emetic dose?
A.—0.25 Gm. or 4 gr.

Q.—What important test solution is made from copper sulphate?
A.—Alkaline cupri tartrate test solution, commonly called Fehling's Solution.

Q.—Is the salt poisonous?
A.—Yes, but ordinarily it is so irritant that it will cause vomiting if a poisonous dose is taken.

TIN

Q.—What is the Latin name for **Tin**?
A.—Stannum.

Q.—What is its symbol and atomic weight?
A.—Sn.; 119.

Q.—Is it or any of its salts official?
A.—No, except as reagents and test solutions.

SILVER AND ITS SALTS

Q.—What is the symbol and atomic weight of **Silver**?
A.—Ag.; 107.88.

Q.—How does it come that Ag is the symbol?
A.—From the Latin name for it, Argentum.

Q.—Is it ever found free?
A.—Yes, in considerable quantities, but much larger quantities are found in combination.

Q.—What are the natural compounds?
A.—Cerargyrite, horn silver, AgCl; argentite Ag_2S; proustite Ag_3AsS_3; pyrargyrite Ag_3SbS_3; stephanite $5Ag_2S.\ Sb_2S_3$.

Q.—Is the metallic element official?
A.—No.

Q.—What salts of silver are official?
A.—Argenti Nitras, Argenti Nitras Fusus, Argenti Oxidum.

Q.—What is the chemical formula for **Silver Nitrate?**
A.—$AgNO_3$.

Q.—How is it made?
A.—By dissolving pure silver in diluted nitric acid, then evaporating the solution until the salt crystallizes out.

Q.—How pure must the salt be?
A.—99.8%.

Q.—How is it preserved?
A.—In dark, amber-colored vials protected from the light.

Q.—What effect does the light have on it?
A.—Reduces it to the oxide or to metallic silver.

Q.—What else will do this?
A.—Contact with organic matter.

Q.—Is it soluble in water?
A.—Yes, readily so. 1 Gm. dissolves in 0.4 mil.

Q.—Is it poisonous?
A.—Yes.

Q.—What is the antidote?
A.—A solution of common salt, this unites with the silver nitrate to form silver chloride which is insoluble.

Q.—Is it given internally in medicine?
A.—Yes.

Q.—What is the dose?
A.—0.01 Gm. or 1/6 gr.

Q.—What is it therapeutically?
A.—Astringent, germicide and escharotic.

Q.—How is it usually administered internally?
A.—In the form of a pill.

Q.—How is it generally used externally?
A.—In the form of a solution.

Q.—Being escharotic why is the tissue not more deeply affected than is usually the case?
A.—The silver forms a silver albuminate with the skin, this being insoluble prevents deeper penetration.

Q.—How should pills of silver nitrate be prepared?
A.—Kaolin is preferably used as a diluent and petrolatum as an excipient.

Q.—Why are these used?
A.—Because the use of anything organic will tend to reduce the silver nitrate to silver oxide or to metallic silver.

Q.—What other form of silver nitrate is official?
A.—**Argenti Nitras Fusus.**

Q.—What is the English title for it?
A.—Moulded Silver Nitrate.

Q.—What are the synonyms?
A.—Fused Silver Nitrate, Lunar Caustic.

Q.—How pure must it be?
A.—Must contain not less than 94.5% $AgNO_3$.

Q.—How is it made?
A.—4 Gm. of hydrochloric acid are mixed with 100 Gm. of silver nitrate, the mixture melted at as low a temperature as is possible, then the mixture is poured into moulds.

Q.—By this process what constituent is formed?
A.—Silver chloride.

Q.—Why is this desirable in the Lunar Caustic?
A.—It renders the mass less brittle.

Q.—How must it be kept?
A.—In dark, amber-colored vials, protected from light.

Q.—Is this form of silver nitrate ever given internally?
A.—No, principally because of the impurities which it contains.

Q.—How should solutions of silver nitrate be dispensed?
A.—In dark, amber-colored, glass-stoppered bottles.

Q.—Why should the bottles be glass-stoppered?
A.—Because dust from a cork stopper would tend to reduce the silver nitrate.

Q.—What is the chemical formula for Silver Oxide?
A.—Ag_2O.

Q.—How is it made?
A.—By adding a solution of pure silver nitrate to a solution of either sodium or potassium hydroxide, washing the resulting precipitate well and drying on the water-bath.

Q.—Why is ammonia-water not suitable for making the oxide?
A.—It forms a soluble compound with the oxide having the composition of $Ag_2O + NH_3$.

Q.—How pure must it be?
A.—99.6%.

Q.—How must it be stored?
A.—In well-stoppered, dark, amber-colored bottles.

Q.—What precautions are directed by the U. S. P. in handling and dispensing it?
A.—It must not be triturated with easily oxidizable substances and must not be brought in contact with ammonia.

Q.—Why must it not be triturated with easily oxidizable substances?
A.—They are likely to take fire.

Q.—Why must it be protected from light?
A.—Light reduces it to metallic silver.

Q.—Why must it not be brought into contact with ammonia water?
A.—It dissolves and forms ammonio-argentic hydroxide, if the solution is then evaporated it deposits black crystals of an explosive nature.

Q.—What is the color of the oxide?
A.—Brownish-black.

Q.—Is it soluble?
A.—No, not in water.

Q.—What is it therapeutically?
A.—Astringent.

Q.—What is the dose?
A.—0.06 Gm. or 1 gr.

Q.—What is "argyria"?
A.—A form of chronic silver poisoning in which small particles of metallic silver deposit in the tissues giving the patient a bluish slaty color.

Q.—Can this be cured?
A.—No, the coloring is permanent.

ANTIMONY AND ITS COMPOUNDS

Q.—What is the symbol and atomic weight of **Antimony?**
A.—Sb.; 120.2.

Q.—Why is Sb the symbol for Antimony?
A.—Derived from the Latin title Stibium.

Q.—Is it found free in nature?
A.—Yes, to a limited extent but more often in combination.

Q.—What is the chief source of the metal?
A.—Derived principally from the native sulphide called antimonite.

Q.—What is the specific gravity of the metal?
A.—6.7.

Q.—What salts are official?
A.—No.

Q.—What salts are official?
A.—Antimonii et Potassii Tartras, Antimonii Oxidum, Antimonium Sulphuratum.

Q.—Which is the one of greatest importance?
A.—**Antimonii et Potassii Tartras.**

Q.—What are the synonyms for it?
A.—Antimonyl Potassium Tartrate, Tartrated Antimony, Tartar Emetic.

Q.—How is the salt made?
A.—By heating antimony oxide with potassium bitartrate in watery mixture. A solution is effected and this is filtered and set aside to crystallize.

Q.—What is the chemical formula for it?
A.—$K(SbO)C_4H_4O_6 + 1/2\ H_2O$.

Q.—What kind of a salt is this called?
A.—A double salt.

Q.—What is the radical (SbO) called?
A.—Antimonyl.

Q.—Is tartar emetic water-soluble?
A.—Yes, 1 Gm. dissolves in 12 mils of water.

Q.—What effect does exposure to the air have on it?
A.—It effloresces.

Q.—What is it therapeutically?
A.—Expectorant, emetic, and is sometimes given as an alterative, diaphoretic.

Q.—What is the dose?
A.—Expectorant 0.005 Gm. or $\frac{1}{12}$ gr.

Q.—How much should be given as an emetic?
A.—$\frac{1}{2}$ to 1 grain.

Q.—Into what preparations does it enter?
A.—Compound Mixture of Glycyrrhiza, Compound Syrup of Squill, Cole's Dinner Pills, Wine of Antimony.

Q.—What is the antidote for poisoning by Tartar Emetic?
A.—Give plenty of tannin for the purpose of forming the insoluble antimony tannate.

Q.—What is the chemical formula for **Antimony Oxide**?
A.—Sb_2O_3.

Q.—How is it made?
A.—By pouring a solution of antimonous chloride into a considerable quantity of water. This precipitates antimonous oxychloride which is then decomposed with sodium carbonate.

Q.—Is it water-soluble?
A.—No.

Q.—What is it therapeutically?
A.—Diaphoretic and cardiac sedative.

Q.—What is the dose?
A.—0.06 Gm. or 1 gr.

Q.—Into what preparation does it enter?
A.—Antimonial Powder, sometimes called James' Powder.

Q.—What is the English name for **Antimonium Sulphuratum?**
A.—Sulphurated Antimony.

Q.—What are the synonyms?
A.—Antimonium Oxysulphuratum. Kermes Mineral.

Q.—How is it made?
A.—By boiling a mixture of purified antimony sulphide, water and sodium hydroxide, then adding sulphuric acid to the mixture until no further precipitate is produced. The precipitate is then washed and dried.

Q.—How does the N. F. define it?
A.—Chiefly antimony trisulphide with small quantities of antimony trioxide, sodium pyroantimonate and free sulphur. It contains not less than 45% of antimony. Preserve it in well-closed containers protected from the light.

Q.—What color is it?
A.—Red-brown.

Q.—What effect does light have on it?
A.—Makes the color lighter.

Q.—Is it water-soluble?
A.—No.

Q.—What is it therapeutically?
A.—Diaphoretic, alterative and emetic.

Q.—What is the dose?
A.—The N.F. gives no dose.

Q.—Is it ever given internally?
A.—Rarely by itself, but it is an ingredient of Pilulæ Antimonii Compositæ.

Q.—Why are the antimonials rarely used as emetics?
A.—Because of their depressant action.

Q.—When given as diaphoretics in fever, what synergists are usually employed?
A.—Small amounts of morphine or ipecac.

Q.—What is the external action of the antimonials?
A.—They are pustulants.

BISMUTH AND ITS COMPOUNDS

Q.—What is the symbol and atomic weight of **Bismuth?**
A.—Bi.; 208.

Q.—Is bismuth found free in nature?
A.—Yes.

Q.—Is it also found in combination?
A.—Yes, as bismuthine, Bi_2S_3.

Q.—What is its specific gravity?
A.—9.8.

Q.—Is it official?
A.—No.

Q.—What industrial use is made of the metal?
A.—It is used for alloys to produce low melting point metals, to be used as safety plugs in steam boilers, and in automatic water sprinklers for fire protection. Also in type metal.

Q.—What dangerous impurity is frequently found in bismuth?
A.—Arsenic.

Q.—What general therapeutic properties are ascribed to bismuth compounds and preparations?
A.—They are said to be sedative and astringent.

Q.—Are they actively astringent?
A.—No.

Q.—How do they act as sedatives?
A.—This action is almost wholly due to the insolubility of the salt. It covers the irritated mucous membrane with an insoluble coating and thus prevents further irritation.

Q.—What bismuth salt is taken as the standard in the valuation of bismuth compounds?
A.—Bismuth Oxide.

Q.—Name the official bismuth salts.
A.—Bismuthi Betanaphtholas, Bismuthi et Ammonii Citras, Bismuthi Subcarbonas, Bismuthi Subgallas, Bismuthi Subnitras, Bismuthi Subsalicylas.

Q.—What is the definition for **Bismuthi Betanaphtholis?**
A.—A compound of bismuth and betanaphthol of somewhat varying composition, yielding not less than 15% of betanaphthol

($C_{10}H_7OH$) and, upon ignition not less than 73% nor more than 78% of bismuth oxide (Bi_2O_3).

Q.—How is the salt prepared?
A.—May be made by reaction between sodium naphtholate and bismuth nitrate.

Q.—What is the color of the salt?
A.—Buff to grayish-brown.

Q.—Is it water-soluble?
A.—No.

Q.—How does exposure to the air affect it?
A.—No effect, permanent in the air.

Q.—What use is made of it?
A.—Used as an intestinal antiseptic.

Q.—What is the dose?
A.—0.5 Gm., or 8 gr.

Q.—Which is the only soluble official salt of bismuth?
A.—**Bismuth et Ammonii Citras.**

Q.—What is the synonym for it?
A.—Bismuth Ammonio-Citrate.

Q.—How is it made?
A.—Bismuth citrate is rubbed to a paste with water, then heated on a water-bath and while heating ammonia water is gradually added until the pasty mixture goes into solution. The solution is then concentrated to a syrupy consistence and spread on glass plates to dry.

Q.—In what form is this salt found in the market?
A.—As scales, or as a white powder.

Q.—What effect does exposure to the air have on it?
A.—It becomes opaque and loses ammonia.

Q.—How does the U. S. P. define the salt?
A.—Bismuth citrate rendered soluble by the presence of ammonium citrate; when dried to constant weight in a desiccator over sulphuric acid, it yields upon ignition not less than 46% nor more than 52% of bismuth oxide. Preserve it in well-closed containers protected from light.

Q.—If the salt does not form a perfect solution in water what is the probable reason?
A.—Probably due to the loss of ammonia.

Q.—What should be done to make it go into solution?
A.—Add ammonia water drop by drop with constant stirring.

Q.—How is the salt administered?
A.—Preferably in solution.

Q.—What is the dose?
A.—0.125 Gm. or 2 gr.

Q.—What is it therapeutically?
A.—Astringent.

Q.—Give the U. S. P. definition for **Bismuthi Subcarbonas.**
A.—A basic bismuth carbonate of varying chemical composition, which when dried to constant weight at 100° C yields upon ignition not less than 90% of Bi_2O_3.

Q.—How is it made?
A.—Bismuth is dissolved in nitric acid to form bismuth nitrate. To this is added ammonia water. The resulting precipitate is well washed with water. More nitric acid is added to produce a solution of bismuth nitrate which is filtered. This is mixed with a solution of sodium carbonate which forms a precipitate, this is well washed and dried with gentle heat.

Q.—What dangerous impurity is removed in the course of producing this subcarbonate?
A.—Arsenic.

Q.—How is it removed?
A.—The arsenic precipitates from solution as bismuth subarsenate and is removed by filtration.

Q.—When the first solution of bismuth nitrate is poured into water, what forms?
A.—Bismuth subnitrate.

Q.—Why is it that ammonia water is added?
A.—If the solution is acid the basic or sub salt will not form, so ammonia water is added to the mixture to combine with the nitric acid.

Q.—How does exposure to the air affect it?
A.—Has no effect, permanent in the air.

Q.—What is it therapeutically?
A.—Tonic and astringent.

Q.—What is the dose?
A.—0.5 Gm. or 8 gr.

Q.—What is the synonym for **Bismuthi Subgallas?**
A.—Dermatol.

Q.—How is the salt made?
A.—Bismuth oxide is rubbed with water, then an excess of gallic acid is added and the trituration continued until the mixture assumes a greenish-yellow color. The mixture is allowed to stand, then washed and dried.

Q.—How much bismuth oxide must it yield?
A.—Not less than 52% nor more than 57%.

Q.—What is it therapeutically?
A.—Astringent and sedative.

Q.—What is the dose?
A.—0.5 Gm. or 8 gr.

Q.—Is it ever used externally?
A.—Yes, as an application to wounds and ulcers, and is used in the treatment of some forms of eczema.

Q.—What is given as the chemical formula for **Bismuthi Subnitras?**
A.—$BiONO_3$, also $Bi(OH)_2NO_3$.

Q.—How is the salt prepared?
A.—In quite the same manner as the subcarbonate, except of course the subcarbonate is dissolved in an excess of nitric acid and then precipitated by adding to an excess of water, and left as such.

Q.—Does this mean that sodium carbonate is used in the making of bismuth subnitrate?
A.—Yes.

Q.—What is the primary idea in making use of the carbonate?
A.—To free the salt from any possible arsenic impurity.

Q.—How is most of the arsenic removed?
A.—By the addition of an excess of sodium carbonate which converts the arsenic to sodium arsenate which is soluble and is retained as such in the alkaline liquid.

Q.—How much bismuth oxide must this salt yield?
A.—Not less than 79%.

Q.—What effect does exposure to air have on it?
A.—It is somewhat hygroscopic.

Q.—Which is the most used salt of bismuth?
A.—Bismuth subnitrate.

Q.—What is it therapeutically?
A.—Astringent, tonic, sedative.

Q.—What is the dose?
A.—0.5 Gm. or 8 gr.

Q.—What is it most used for?
A.—To allay vomiting and to check diarrhea.

Q.—How is it best administered for such effect?
A.—In powders.

Q.—Is it always administered in this form?
A.—No, it is frequently mixed with liquids but it is so insoluble and heavy that it should be suspended by syrup or mucilage and well shaken at the time the dose is taken. This makes accurate dosage impossible.

Q.—Is it ever prescribed in massed capsules?
A.—Yes, generally in combination with sodium bicarbonate.

Q.—What is likely to happen when the mass is made?
A.—If the excipient contains any moisture, the subnitrate is hydrolyzed and a small quantity of nitric acid forms. This attacks the bicarbonate and carbon dioxide is released which causes the mass to swell so the caps can not be made to stay on the bodies of the capsules.

Q.—What is the remedy in this case?
A.—There are several. (1st) use an excipient which contains no moisture, as freshly prepared glycerite of starch. (2nd) make the mass and let it stand until the reaction is complete, then put in capsules, but this will require several hours. (3rd) it is the action of the bismuth that is wanted not the nitrate hence it is permissible to use the subcarbonate instead of the subnitrate, then no acid is liberated.

Q.—Into what preparations does it enter?
A.—Magma Bismuthi. Glyceritum Bismuthi. Unguentum Resorcinolis Compositum.

Q.—By what common name is it sometimes called?
A.—Bismuthi Magisterii.

Q.—How does the U. S. P. define **Bismuthi Salicylas?**
A.—A basic bismuth salicylate of varying chemical composition, which when dried to constant weight at 100° C., yields, upon ignition, not less than 62% nor more than 66% of Bi_2O_3. Protect it from light.

Q.—How is it made?
A.—Crystallized bismuth nitrate is dissolved in nitric acid, then precipitated with an excess of sodium hydroxide solution. This is boiled to convert it into yellow crystalline anhydrous oxide. Salicylic acid is rubbed up with water and this paste added to the oxide on the water-bath. It is there heated until none of the yellow crystalline needles are left. It is then washed with cold alcohol and dried in an oven.

Q.—What effect does exposure to the air have on it?
A.—None, it is permanent.

Q.—What is it therapeutically?
A.—Astringent and antiseptic, dose 0.5 Gm. or 8 gr.

GOLD AND ITS COMPOUNDS

Q.—What is the symbol and atomic weight of **Gold?**
A.—Au.; 197.2.

Q.—Is gold found free in nature?
A.—Yes, principally so.

Q.—Is it official?
A.—No.

Q.—What salt is official?
A.—**Auri et Sodii Chloridum.**

Q.—How does the U. S. P. define it?
A.—A mixture of equal parts of anhydrous gold chloride and anhydrous sodium chloride representing, when dried to constant weight in a desiccator over sulphuric acid, not less than 30% of metallic gold. Preserve it in well-stoppered, amber-colored vials.

Q.—Is it water-soluble?
A.—Yes, very soluble.

Q.—What effect does exposure to air have on it?
A.—It is deliquescent.

Q.—What color is the salt?
A.—Orange-yellow.

Q.—What is it therapeutically?
A.—Alterative and tonic, stimulant.

Q.—What is the dose?
A.—0.005 Gm. or $\frac{1}{12}$ gr.

Q.—What brought this salt into prominence?
A.—Its exploitation as a cure for the alcohol habit.

Q.—Was it of particular value in this direction?
A.—No, no more so than other tonics.

URANIUM AND ITS SALTS

Q.—What is the symbol and atomic weight of **Uranium?**
A.—U.; 238.5.

Q.—Is the element found free?
A.—No.

Q.—From what is it obtained?
A.—Pitchblende.

Q.—What is the chemical make-up of Pitchblende?
A.—Uranoso-uranic oxide, U_3O_8 or $UO_2 2UO_3$.

Q.—What salt of uranium is official?
A.—**Uranium nitrate.**

Q.—What is the chemical formula?
A.—$UO_2(NO_3)_2 + 6H_2O$.

Q.—What is the chemical name for the salt?
A.—Uranyl nitrate.

Q.—How is it obtained?
A.—By first roasting the pitchblende to rid of arsenic and sulphur. The ore is then ground and washed with hydrochloric acid in which the oxide of uranium is insoluble. The residue is finally converted into nitrate by dissolving in nitric acid, evaporated and crystallized.

Q.—What color is the salt?
A.—Light yellow.

Q.—Is it water-soluble?
A.—Yes, 1 Gm. dissolves in 1.2 mils of water.

Q.—What effect does exposure to air have on it?
A.—Efflorescent.

Q.—Is it radio active?
A.—Yes.

Q.—What use is made of it?
A.—Used in the treatment of diabetes mellitus.

Q.—What is the dose?
A.—0.01 Gm. or 1/6 gr.

Q.—What does the U. S. P. direct regarding its use?
A.—To use with caution.

MUCILAGES

Q.—Name the three classes of extractive preparations in which Water is used as a menstruum.
A.—Mucilages, infusions and decoctions.

Q.—Give the Latin title for Mucilages.
A.—Mucilago, (pl.) Mucilagines.

Q.—Are they in every instance truly extractive preparations?
A.—No.

Q.—Point out the prominent exceptions.
A.—Mucilago Acaciæ, Tragacanthæ.

Q.—Why are these exceptions?
A.—Mucilage of acacia is a **solution** of the gum. Tragacanth is not soluble in water nor is the mucilaginous principle.

Q.—Define Mucilages.
A.—They are thick, sticky, liquid, or semi-liquid preparations made by dissolving gums in water or extracting the mucilaginous principles of vegetable drugs with water.

Q.—How many mucilages are official?
A.—Four.

Q.—Name them.
A.—Mucilago Acaciæ, Tragacanthæ, Chondri, Sassafras Medullæ.

Q.—Which are U. S. P.?
A.—Acaciæ and Tragacanthæ.

Q.—Name the N. F. mucilages.
A.—Chondri and Sassafras Medullæ.

Q.—What is the strength of **Muc. Acaciæ?**
A.—35% by weight of Acacia.

Q.—What is another name for Acacia?
A.—Gum Arabic.

Q.—How is the Acacia first treated?
A.—Washed with cold water, then drained.

Q.—What kind of water does the U. S. P. direct for making the mucilage?
A.—Warm, distilled water.

Q.—By what method is the solution preferably made?
A.—Circulatory displacement.

Q.—What is the average dose?
A.—15 mils.

Q.—What is the strength of **Muc. Tragacanthæ?**
A.—6% by weight.

Q.—What other ingredients are used?
A.—18% of glycerin; water to 100%.

Q.—Why is the glycerin used?
A.—To prevent fermentation.

Q.—How is it made?
A.—The glycerin and 75% of the water are mixed and heated to the boiling point, then the gum is added and allowed to macerate for 24 hours. Water is added to 100% and the mixture is thoroughly beaten, then forcibly strained through muslin.

Q.—Is it ever given internally?
A.—No, the U. S. P. gives no dose.

Q.—What particular use is made of it?
A.—It may be used as an excipient but forms the vehicle for numerous nongreasy toilet creams.

Q.—What is the strength of **Muc. Chondri?**
A.—3% weight volume.

Q.—How is the chondrus first treated?
A.—Washed with cold water.

Q.—Why is the cold water used?
A.—To remove adhering dirt and remove an objectionable bitter principle.

Q.—What is next done with it?
A.—It is heated with the water on a water-bath for 15 minutes, then strained.

Q.—What is the synonym for Chondrus?
A.—Irish moss.

Q.—Has mucilage of Irish Moss any advantages over the other mucilages?
A.—None, except that it is cheaper.

Q.—What is the strength of **Muc. Sassafras Medullæ?**
A.—2%.

Q.—How is it prepared?
A.—The substance is allowed to macerate in the water for 3 hours and then strained without expression.

Q.—What is the dose?
A.—15 mils.

Q.—Is it ever given internally?
A.—Rarely.

Q.—What use is made of it?
A.—Used in ophthalmology; particularly in the treatment of conjunctivitis.

Q.—Are the mucilages made from potent drugs?
A.—No, from nonpotent.

Q.—How does this affect the doses?
A.—The doses are large.

Q.—Why should they be freshly made at the time of using?
A.—Because they readily ferment.

Q.—Why do they ferment?
A.—Because there are small quantities of gum, starch, sugar and albumen extracted from the drug and these in aqueous solution develop bacteria which set up fermentation.

Q.—Is it permissible to use antiseptics to prevent this?

A.—Not when the mucilages are to be used as medicines, there is perhaps no objection to their use when the mucilage is for office use.

Q.—Name an incompatibility of mucilages?

A.—Alcoholic liquids.

Q.—Why are these incompatible?

A.—Because the mucilaginous principles are not soluble in alcohol, hence are precipitated when mixed.

Q.—Is there any exception to this rule?

A.—Yes, Mucilage of Sassafras Pith when so mixed.

Q.—How will Mucilages behave with Alkali Carbonates and Bicarbonates?

A.—If the mucilages are fresh no reaction will occur but if there has been any fermentation, which will of course develop acid, the acid will attack the carbonate and CO_2 will be liberated. This would be likely to blow the stopper out of the bottle or fracture the container.

Q.—Which of the official Mucilages are made with the aid of heat?

A.—Mucilago Tragacanthæ and Chondri.

Q.—How does the U. S. P. direct Mucilage Acaciæ be stored?

A.—In small, well-filled bottles in a refrigerator, or in a cool place.

INFUSIONS

Q.—Give the Latin title for Infusions.

A.—Infusum, (pl.) Infusa.

Q.—From what is the word derived?

A.—From the Latin word "infundere" meaning "to pour on".

Q.—Define Infusions.

A.—Liquid preparations for internal use made by extracting the water-soluble principles of vegetable drugs with hot or cold water.

Q.—What is the general strength of Infusions?

A.—5% unless otherwise directed.

Q.—What infusions should not be made 5% strength?

A.—Those made from potent or very active drugs.

Q.—Give the process for making Infusions.

A.—Place 5% of the coarsely comminuted drug in a nonmetallic container which can be tightly covered. Pour on 100 parts of boiling water. Cover closely, let stand for a half-hour. Strain with expression and pass sufficient water through the strainer to make up the required quantity.

Q.—Does it matter if the Infusion stands longer than the half hour before straining?

A.—Yes, for the hot water will extract besides the active principles, sugar, gum, starch and albumen. All of these tend to ferment quickly when in dilute solution and of course the longer the preparation stands the more of such matter will be extracted.

Q.—Why should Infusions be freshly prepared?

A.—For the reason just stated, they are likely to ferment quickly.

Q.—What care must the pharmacist observe in preparing unofficial infusions?

A.—To have the strength of those made from powerful and energetic drugs especially prescribed by the doctor.

Q.—Name the advantages of Infusions over other preparations of the same drugs.

A.—The other preparations are usually made with alcohol, so large doses of the drug can not be given without getting the therapeutic effect of the alcohol, but this is not the case with infusions. Also water is cheaper and prescriptions for infusions can be prepared more cheaply than alcoholic preparations, an advantage to the patient.

Q.—When is cold water used in making an Infusion?

A.—When heat interferes with the activity of the Infusion.

Q.—How many Infusions are official?

A.—Seven. Two U. S. P. and five N. F.

Q.—Name the U. S. P. Infusions.

A.—Infusum Digitalis and Sennæ Compositum.

Just

Q.—What is the strength of Inf. Digitalis?

A.—1½%.

Q.—What does it contain besides Digitalis and Water?

A.—15% of Aqua Cinnamomi.

Q.—What is the Cinnamon Water for?
A.—To give the Infusion a more pleasant flavor.

Q.—At what time is the Cinnamon Water added?
A.—After the Infusion has cooled and been strained.

Q.—Why is it added at that time?
A.—If added while hot the volatile oil would be driven off.

Q.—Name three particulars in which Infusum Digitalis differs from ordinary infusions.
A.—Its strength is 1.5%; only half the quantity of boiling water is poured on the drug; it is allowed to macerate a full hour instead of a half-hour.

Q.—From what form of Digitalis must the Infusion be invariably made?
A.—From the official leaves.

Q.—Is it ever prepared otherwise?
A.—Yes, through ignorance or unscrupulousness some persons use the fluidextract.

Q.—What is the particular objection to its use?
A.—When the physician prescribes the Infusion he wants only the water-soluble principles.

Q.—What is the probable reason for this?
A.—The desire to give the patient large doses of digitalis, which would not be possible with the alcoholic extracts because of the digitoxin present.

Q.—What are the active constituents in digitalis?
A.—Digitonin and digitalin.

Q.—Are these water-soluble?
A.—They are described as being only slightly soluble each by itself, but the presence of both increases the solubility of each other.

Q.—What is Infusion of Digitalis therapeutically?
A.—Cardiac stimulant; diuretic, because of supplying an increased amount of blood to the kidneys, thus causing an increased flow of urine.

Q.—What is the dose?
A.—4 mils.

Q.—What is the common name for **Inf. Sennæ Comp**?
A.—Black draught.

Q.—What does it contain?
A.—Senna 6%, Manna 12%, Fennel 2%, Magnesium sulphate 12%.

Q.—How is it made?
A.—The vegetable drugs are placed in a suitable container and 80% of boiling water poured on. Allowed to stand ½ hour, strained and in the strained liquid the magnesium sulphate is dissolved, then strained again and sufficient water added through the strainer to make the required quantity.

Q.—Why is the Fennel present?
A.—To flavor the preparation and being a carminative it is said to overcome the griping action of the senna.

Q.—What is this preparation therapeutically?
A.—Purgative.

Q.—What is the dose?
A.—120 mils.

Q.—What confusion might arise when this is called for by its common name?
A.—The name Black Draught might be confused with Black Drop the common name for Acetum Opii.

Q.—Name the Infusions of the National Formulary.
A.—Infusum brayeræ, cinchonæ, gentianæ compositum, pruni virginianæ, rosæ compositum.

Q.—What is the strength of **Inf. Brayeræ**?
A.—6%.

Q.—In what particular does this differ from the ordinary infusion?
A.—It is dispensed without straining.

Q.—What is the common name for Brayera?
A.—Cusso.

Q.—What is it therapeutically?
A.—Anthelmintic and tænifuge.

Q.—What is the dose?
A.—250 mils.

Q.—What is the strength of **Inf. Cinchonæ?**
A.—6%.

Q.—What else is there in it?
A.—1% aromatic sulphuric acid.

Q.—What is the acid for?
A.—To render the alkaloids in the cinchona more soluble.

Q.—How is this infusion prepared?
A.—By percolation with cold menstruum.

Q.—Describe the process.
A.—Mix the acid with half the water, moisten the powder, then pack in a conical percolator, first use rest of menstruum, then follow with water.

Q.—What is this therapeutically?
A.—Tonic and antiperiodic.

Q.—What is the dose?
A.—50 mils.

Q.—What is there in **Inf. Gentianæ Compositum?**
A.—Gentian 3%, coriander 0.8%, bitter orange peel 0.8%.

Q.—How is this prepared?
A.—By cold percolation with diluted alcohol, then dilution with water.

Q.—Describe procedure.
A.—Moisten the powdered drugs with dilute alcohol, then pack in a percolator and extract with dilute alcohol until 25% of percolate is obtained, then add sufficient water to make 100%.

Q.—What class of preparations is this process more applicable to than infusions?
A.—Tinctures.

Q.—What is this therapeutically?
A.—Tonic; stomachic.

Q.—What is the dose?
A.—15 mils.

Q.—What is the strength of **Inf. Pruni Virginianæ?**
A.—4% of the bark.

Q.—What else is there in it?
A.—5% of glycerin.

Q.—Upon what does this depend for its activity?
A.—Hydrocyanic acid.

Q.—Does hydrocyanic acid exist in the bark?
A.—No, it is developed by the action of a ferment Emulsin on a glucoside Amygdalin in the presence of moisture.

Q.—Is it made with hot or cold water?
A.—Cold water.

Q.—Why is cold water used?
A.—Because hot water would destroy the ferment and thus prevent the formation of hydrocyanic acid.

Q.—How is it prepared?
A.—Macerated with 90% of water in a percolator for three hours, then the required volume of percolate is collected in a receiver containing the glycerin.

Q.—What is the glycerin for?
A.—It prevents the precipitation of the astringent matter which has been extracted.

Q.—Why is the glycerin not mixed with menstruum?
A.—Because it would extract too much astringent constituent.

Q.—What is it therapeutically?
A.—Sedative and astringent.

Q.—What is the dose?
A.—60 mils.

Q.—What is there in **Inf. Rosæ Compositum?**
A.—Red rose 1.3%, dilute sulphuric acid 0.9%, sugar 4%.

Q.—How is it prepared?
A.—By the regular process of infusion with boiling water.

Q.—Give procedure in detail.
A.—Place the red rose in a suitable container, pour on 100% of boiling water, allow to stand one hour, then dissolve the sugar in the liquid and strain.

Q.—What is this therapeutically?
A.—Astringent.

Q.—What is the dilute sulphuric acid for?
A.—Develops richer color, increases astringency and imparts a more agreeable taste to the preparation.

Q.—What is the dose?
A.—100 mils.

DECOCTIONS

Q.—Define Decoctions.
A.—Liquid preparations for internal use made by exhausting vegetable drugs by boiling them in water.

Q.—What is the strength of Decoctions?
A.—5% unless otherwise directed.

Q.—What care must be exercised by the pharmacist in preparing decoctions?
A.—To see that the strength of decoctions of powerful and energetic drugs is specially designated by the physician.

Q.—Give the process for preparing decoctions.
A.—Introduce the coarsely comminuted drug into a suitable container provided with a cover and pour upon it 100% of cold water. Cover and boil for 15 minutes. Let cool to 40°C. Express and strain the expressed liquid, then pass enough cold water through the strainer to make the required quantity.

Q.—How many U. S. P. decoctions are official?
A.—None, but the process is official.

Q.—What N. F. decoction is official?
A.—Decoctum Sarsaparillæ Compositum.

Q.—What does it contain?
A.—Sarsaparilla 10%, sassafras, guaiac wood and glycyrrhiza each 2%, mezereum 1%.

Q.—Outline the method of its preparation.
A.—The sarsaparilla and the guaiac wood are mixed with 100 parts of water in a suitable vessel and boiled for 30 minutes, replacing water from time to time which has been lost by evaporation. Remove from the heat, add balance of ingredients, cover closely and macerate for 2 hours. Strain and add enough water through the strainer to make required quantity.

Q.—What is this therapeutically?
A.—Alterative.

Q.—What is the dose?
A.—120 mils.

Q.—What does the U. S. P. especially direct about the making of decoctions?
A.—That they be freshly made from the drugs.

Q.—What class of drugs is best adapted to extraction by infusion?

A.—Those containing the more volatile principles and the most easily exhausted, as flowers, leaves and soft stems.

Q.—What class is better adapted to decoction?

A.—Those which are rather harder of extraction, as seeds, roots and barks.

VINEGARS

Q.—Give the Latin name for Vinegars.

A.—Aceta, sing. Acetum.

Q.—Define Vinegars.

A.—Liquid preparations usually intended for internal use made by extracting vegetable drugs with dilute acetic acid.

Q.—Why are they called Vinegars?

A.—Because vinegar was formerly used to make these preparations but the acetic acid content was so variable it was abandoned and the official dilute acetic acid substituted.

Q.—What is the strength of Dilute Acetic Acid?

A.—6% by weight of absolute acetic acid.

Q.—How is Dilute Acetic Acid usually prepared?

A.—By mixing 12 Gm. of Acetic Acid with 61 Gm. water.

Q.—How many Vinegars are official?

A.—Three.

Q.—Name them.

A.—Acetum Scillæ, Opii, Aromaticum.

Q.—Which is the U. S. P. preparation?

A.—**Acetum Scillæ.**

Q.—What is its strength?

A.—10%.

Q.—How is it prepared?

A.—The squill in a coarse powder is macerated with the dilute acetic acid for seven days with frequent agitation, then strained, enough dilute acetic acid passed through the residue on the strainer to make practically 100%. It is then brought to the boiling point and filtered while hot and enough dilute acetic acid to make 100% is added.

Q.—Why is it heated and filtered?

A.—Heated to coagulate the albumen which has been extracted, then filtered to remove it from the preparation.

Q.—Why is it necessary to remove the albumen from the Vinegar of Squill?

A.—Because it would quickly cause fermentation.

Q.—What is it therapeutically?

A.—It is not much prescribed but is said to be an irritant diuretic.

Q.—What is the dose?

A.—1 mil.

Q.—What particular use is made of it?

A.—Principally used for making the Syrup of Squill.

Q.—Might squill be classed as a potent drug?

A.—Yes.

Q.—With what other drug might it be classed as to potency and therapeutic activity?

A.—Digitalis.

Q.—What is there in **Acetum Aromaticum?**

A.—Oil of Lavender, Rosemary, Juniper, Peppermint, Cinnamon each 0.05%, oil of Lemon and Clove each 0.1%, Alcohol 25%, Acetic Acid 26%, Water to 100%.

Q.—How is it made?

A.—The oils are dissolved in the alcohol, then the acetic acid added, then the water. It is allowed to stand for 8 days with frequent agitation, then filtered.

Q.—Is it ever given internally?

A.—No, it is more of the nature of a toilet preparation. It is sometimes used to bathe the head and temples in case of headache.

Q.—What is the strength of **Acetum Opii?**

A.—10%.

Q.—What form of Opium is used in making it?

A.—Granular Opium.

Q.—What is the morphine strength of Granular Opium?

A.—Not less than 10% nor more than 10.5% anhydrous morphine.

Q.—What else is there in the preparation?
A.—Myristica 3% and sugar 20%.

Q.—What is the common name for Myristica?
A.—Nutmeg.

Q.—Give detailed method for preparing Acet. Opii.
A.—Macerate the solids with 50% of the dilute acetic acid for 7 days, frequently shaking, then transfer to a cylindrical percolator containing a pledget of purified cotton. Allow the percolation to proceed slowly until the liquid has disappeared, then pour on dilute acetic acid and continue percolation until 100% is obtained.

Q.—What percentage of morphine does it contain?
A.—Practically 1%.

Q.—What is the common name of this preparation?
A.—Black drop.

Q.—What other common name is sometimes confused with this?
A.—Black draught, Comp. Infus. Senna.

Q.—What is it therapeutically?
A.—Anodyne and hypnotic.

Q.—What is the dose?
A.—0.5 mil.

Q.—What other synonym has incorrectly been applied?
A.—Sydenham's laudanum.

Q.—What is the particular difference between Sydenham's laudanum and Acet. Opii?
A.—Sydenham's laudanum contains Saffron (Crocus).

VINA—WINES

Q.—Give the Latin singular anl plural for wines.
A.—Vinum. Vina.

Q.—Define wines.
A.—Liquid preparations intended for internal use made by extracting vegetable drugs with, or dissolving chemical salts in wine.

Q.—What kind of wine is used in making the medicinal wines?
A.—White wine.

Q.—What other kind of natural wine is there?
A.—Red wine.

Q.—What is the objection to using Red Wine?
A.—The coloring matter in Red Wine contains tannin which would precipitate the alkaloids of the vegetable drugs, also the metallic salts.

Q.—What White Wine is official?
A.—Vinum Xericum, Sherry wine.

Q.—How much alcohol must this wine contain?
A.—Not less than 16% nor more than 24%.

Q.—Does it naturally contain this much?
A.—No, it is fortified with pure grape brandy.

Q.—Are there any Wines official in the U. S. P.?
A.—No.

Q.—Were there any in the VIII revision?
A.—Yes, several medicated wines and two natural wines.

Q.—Why were they dismissed from the U. S. P.?
A.—Because it was found impossible to formulate tests whereby spurious wines could be positively recognized and distinguished from the pure wines.

Q.—Does the N. F. recognize any wines?
A.—Yes, it accepted most of those deleted from the U. S. P.

Q.—Was the N. F. justified in accepting these after they had been rejected for the above reason?
A.—Yes, several of the deleted wines were largely used and the wine itself is not the medicinal or valuable part of the preparation, hence it was of no particular moment whether the wine was natural or made so long as it provided a satisfactory vehicle for the medicinal agent. The physicians will continue to prescribe them, it was therefore the part of wisdom to have standards for them.

Q.—How many wines are official?
A.—15.

Q.—What processes are used in making them?
A.—Admixture or solution and percolation.

Q.—What particularly important added feature occurs in relation to some of the wines?

A.—Assay processes have been introduced for three of the wines.

Q.—Name the wines.

A.—Vinum Antimonii.
Aurantii Compositum.
Carnis.
Carnis et Ferri.
Colchici Cormi.
Colchici Seminis.
Pruni Virginianæ.
Ferri.
Ferri Amarum.
Fraxini.
Ipecacuanhæ.
Pepsini.
Picis.
Pruni Virginianæ Ferratum.
Rhei Compositum.

Q.—Which are the assayed wines?

A.—Vinum Colchici Cormi, Colchici Seminis, Ipecacuanhæ.

Q.—What is the active constituent in **Vin. Antimonii?**

A.—Antimony and potassium tartrate.

Q.—What is the common name for it?

A.—Tartar emetic.

Q.—What is the Boiling Water for in the formula?

A.—To insure complete solution of the tartar emetic.

Q.—What is the wine therapeutically?

A.—Expectorant and emetic.

Q.—What is the average dose?

A.—1 mil.

Q.—What is there in **Vin. Aurantii Compositum?**

A.—Bitter Orange Peel 20%, Absinthium, Menyanthes, Cascarilla each 6.5%, Saigon Cinnamon and Gentian each 4.3% Potassium Carbonate 1%.

Q.—What is the Potassium Carbonate for?

A.—Some of the vegetable drugs contain principles of a resinous nature and would not dissolve clear in the wine. The car-

bonate converts them into soap-like compounds which make clear solutions in the wine.

Q.—How is the wine prepared?
A.—The several drugs are mixed and saturated with the wine and allowed to macerate for 24 hours and then percolated in the usual manner.

Q.—What is the dose?
A.—4 mils.

Q.—What is the synonym for **Vinum Carnis?**
A.—Beef and Wine.

Q.—What does it contain?
A.—Ext. of Beef 3%, Syrup 10%, Alcohol 5%, Comp. Spt. of Orange 0.1%.

Q.—What is the Alcohol for?
A.—To precipitate the salt present in the Ext. Beef so it may be filtered out.

Q.—What is it therapeutically?
A.—Said to be nutritive.

Q.—What is the dose?
A.—8 mils.

Q.—What is the synonym for **Vinum Carnis et Ferri?**
A.—Beef, Wine and Iron.

Q.—What form of iron is used in this preparation?
A.—Iron and ammonium citrate.

Q.—What is the dose?
A.—8 mils.

Q.—Name the two Colchicicum Wines.
A.—Vinum Colchici Cormi and Vinum Colchici Seminis.

Q.—What is the rubric for **Vin. Colchici Cormi?**
A.—100 mils of the wine must not yield less than 0.126 Gm. nor more than 0.154 Gm. of colchicine.

Q.—How is this wine prepared?
A.—The powdered drug is moistened with a menstruum of 85% of sherry wine and 15% alcohol. Then packed in a conical percolator, on it is gradually poured, first the balance of the menstruum then enough sherry wine to obtain 90% in mils of perco-

late. A sample is then assayed and the colchicine in it ascertained by calculation, it is then adjusted so each 100 mils will contain 0.14 Gm. colchicine.

Q.—What is it therapeutically?
A.—Antirheumatic, alterative, diuretic.

Q.—What is the dose?
A.—0.6 mil.

Q.—To what class of substances does colchicine belong?
A.—Alkaloids.

Q.—Are these two wines potent preparations?
A.—Yes, very potent. If either is taken in large dose and has remained in the stomach long enough to produce its inflammatory effects nothing can be done to save the patient.

Q.—How is **Vin. Colchici Seminis** prepared?
A.—By dissolving 10% of Flext. Colchicum Seed in a mixture of 15% alcohol and 75% sherry wine. The mixture is allowed to stand for 2 days then filtered.

Q.—What is the rubric for this preparation?
A.—Not less than 0.036 nor more than 0.044 Gm. colchicine in each 100 mils.

Q.—Where is the assay process for these two wines found?
A.—Under the Fluidextracts of the same name in the U. S. P. IX and N. F. IV.

Q.—What is the dose of **Vin. Colchici Seminis**?
A.—2 mils.

Q.—What is it therapeutically?
A.—Antirheumatic, alterative, diuretic.

Q.—What form of iron is used in **Vin. Ferri**?
A.—Iron and ammonium citrate.

Q.—What percentage?
A.—4%.

Q.—What else is there in the preparation?
A.—Tr. Sweet Orange Peel 6%, Syrup 10%.

Q.—What is it therapeutically?
A.—Tonic and hæmitinic.

Q.—What form of Iron is used in **Vin. Ferri Amarum?**
A.—Iron and quinine citrate.

Q.—What percentage strength?
A.—5%.

Q.—What percentage of quinine does the salt contain?
A.—11.5%.

Q.—What is the dose of these two wines?
A.—8 mils.

Q.—What is the English name for **Vin. Fraxini?**
A.—Wine of White Ash.

Q.—What is its strength?
A.—50%.

Q.—How is it made?
A.—By maceration and percolation.

Q.—What is the menstruum used?
A.—Alcohol 12.5% and sherry wine 87.5%.

Q.—What is the dose?
A.—4 mils.

Q.—What is it therapeutically?
A.—Alterative, tonic and emmenagogue.

Q.—What is the rubric for **Vin. Ipecacuanhæ?**
A.—100 mils yields not less than 0.180 nor more than 0.220 Gm. of alkaloids from ipecac.

Q.—What form of ipecac is used?
A.—The Fluidextract.

Q.—How much Fluidextract is used?
A.—10%.

Q.—How is the preparation made and from what?
A.—By mixing 10% each of the fluidextract and alcohol with 80% of sherry wine. Let stand two days and filter through paper.

Q.—Explain the meaning of the last sentence in the assay process, "each mil of N/10 sulphuric acid V. S. consumed corresponds to 0.024 of the ether-soluble alkaloids of ipecac."
A.—Alkaloids are like alkalies and have the property of neutralizing or combining with acids. In this case 24 milligrams of

alkaloids exactly neutralizes or fully combines with each mil of the sulphuric acid used in the assay.

Q.—What is this wine therapeutically?
A.—Expectorant, emetic, diaphoretic.

Q.—What form of pepsin is used in making **Vin. Pepsini?**
A.—The glycerite of pepsin.

Q.—Give the formula for this wine.
A.—Glycerite of pepsin 20%, alcohol 10%, sherry wine 70%.

Q.—Should this be kept in stock?
A.—No, it is not to be dispensed unless freshly prepared.

Q.—What is it therapeutically?
A.—Digestive.

Q.—What is the dose?
A.—8 mils.

Q.—What is the English name for **Vinum Picis?**
A.—Wine of tar.

Q.—How much tar does it contain?
A.—10%.

Q.—Is it coal or wood tar?
A.—Wood tar.

Q.—What is the Latin title for Wood Tar?
A.—Pix Liquida.

Q.—Why is the Tar first washed with water?
A.—To remove soluble impurities and empyreumatic products.

Q.—What is the pumice for?
A.—For the purpose of finely dividing the tar so that it will more readily dissolved in the alcohol and wine.

Q.—What is it therapeutically?
A.—Expectorant, stimulant, antiseptic.

Q.—What is the dose?
A.—8 mils.

Q.—What is the Latin title for **Wine of Wild Cherry?**
A.—Vinum Pruni Virginianæ.

Q.—What is the percentage strength?
A.—25%.

Q.—What is first done with the Wild Cherry?

A.—It is moistened with water and allowed to macerate in a percolator for 3 or 4 hours well covered.

Q.—Why is it allowed to macerate in water?

A.—To promote the formation of hydrocyanic acid.

Q.—How is the extraction then made?

A.—The bark is packed moderately firm and a mixture of 10 parts of alcohol and 65 parts of sherry wine is poured on until the bark is saturated and a stratum above the powder is left. As soon as the liquid begins to drop, the lower orifice is closed and it is allowed to macerate again for 12 hours. Then the percolation is allowed to proceed until 90 parts of percolate are obtained, in this 16.5 parts of sugar are dissolved. To this 1.5 parts of purified talc are added and well mixed. It is then filtered, the filtrate being returned until it comes through clear, then sufficient sherry wine is passed through the filter to make 100 parts.

Q.—What is it therapeutically?

A.—Expectorant, sedative, astringent.

Q.—What is the dose?

A.—4 mils.

Q.—Does this preparation contain any tannin?

A.—Yes, some is extracted from the bark during the maceration and percolation.

Q.—Is it incompatible with preparations of iron?

A.—Yes, with most preparations of iron.

Q.—Is there an iron preparation which may be used with it without precipitation?

A.—Yes, tincture of ferric citro-chloride.

Q.—How much of this iron is there in **Vin. Pruni Virginianæ Ferratum**?

A.—8%.

Q.—What forms the balance of the preparation?

A.—92% wine of wild cherry.

Q.—What is the dose?

A.—4 mils.

Q.—Give the Latin title for **Compound Wine of Rhubarb.**

A.—Vinum Rhei Compositum.

Q.—What is there in it?
A.—Flext. rhubarb 8%, flext. bitter orange peel 2%, tr. cardamom 8%, sugar 12.5%, sherry wine to make 100%.

Q.—How is it put together?
A.—Mix the liquids, including 70 parts of wine, in this, dissolve the sugar by agitation, then add sufficient sherry wine to make 100 parts and filter.

Q.—What is it therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—4 mils.

Q.—How many wines are made by percolation?
A.—Four.

Q.—Name them.
A.—Vinum aurantii compositum, colchici cormi, fraxini and pruni virginianæ.

Q.—What preparation of the N. F. is of the nature of wine but is not so named?
A.—**Cordiale Rubi Fructus.**

Q.—What is the English name?
A.—Blackberry Cordial.

Q.—What does it contain?
A.—Saigon Cinnamon 2%; Clove and Myristica, each 0.5%, Syrup Blackberry fruit and Diluted alcohol.

Q.—What is it therapeutically?
A.—Antidiarrhœal; astringent.

Q.—What is the dose?
A.—8 mils.

TINCTURÆ—TINCTURES

Q.—Define Tinctures.
A.—Dilute solutions of nonvolatile substances in alcoholic or hydro-alcoholic liquids, usually made by extracting organic drugs.

Q.—Are there any exceptions to the above definition?
A.—Yes, Tr. Iodine is an exception because it is inorganic and volatile, more like a Spirit. Again Iodine and Ferric Chloride are both chemical substances.

Q.—How many U. S. P. tinctures are there?
A.—54.

Q.—What processes are used in preparing them?
A.—By far the larger portion are prepared by percolation or maceration, but simple solution, digestion, decoction and filtration are also used.

Q.—What liquids are used in the extractions?
A.—Water, alcohol, glycerin, aromatic spirit of ammonia, hydrochloric acid and ether.

Q.—Is there any other liquid used in the preparation of the tinctures?
A.—Yes, purified petroleum benzin.

Q.—How do the strengths of the tinctures vary?
A.—From 5 Gm. to 50 Gm. of the drug in 100 mils of the tincture.

Q.—Into what two classes do most of them fall?
A.—10% when made from potent drugs and 20% when made from less energetic drugs.

Q.—Why are they so arranged?
A.—To conform with the requirements of the International Protocol adopted by the International Conference for the Unification of Potent Remedies.

Q.—What is the meaning of the letters P. I. which are appended to some of the titles?
A.—They stand for International Protocol, meaning that the preparation is of the strength recommended by the International Protocol.

Q.—What two general processes are used in making tinctures?
A.—Percolation and maceration.

Q.—In making the tinctures are complete directions given under each one?
A.—No, the quantity of drug in proper fineness is given, also the menstruum, then the directions are to make by Type Process M or P as the case may be.

Q.—Just what is meant by Type Process P or M?
A.—At the opening of the chapter on tinctures, Type Process of Percolation and Type Process of Maceration are fully de-

scribed, then "P" or "M" is used to indicate Percolation or Maceration as required.

Q.—Why was this plan adopted?
A.—To save space in the U. S. P. and N. F., which was wasted by unnecessarily repeating the directions.

Q.—Can all the official tinctures be made by one of these two processes?
A.—No, and in these cases complete directions are found under the individual tincture.

Q.—What is meant by an assayed tincture?
A.—Tinctures which are assayed chemically and made to contain a definite weight of alkaloid in a definite measure or volume of tincture.

Q.—How many such tinctures are in the U. S. P.?
A.—14.

Q.—Name them.
A.—Tinctura Aconiti.
Belladonnæ Foliorum.
Cinchonæ.
Cinchonæ Composita.
Colchici Seminis.
Ferri Chloridi.
Hydrastis.
Hyoscyami.
Iodi.
Nucis Vomicæ.
Opii.
Opii Deodorati.
Physostigmatis.
Stramonii.

Q.—What new class of standardized tinctures is introduced in U. S. P. IX?
A.—Biologically assayed tinctures.

Q.—What other term is used to mean the same as "biologically assayed"?
A.—Physiologically assayed.

Q.—Why are tinctures biologically assayed?
A.—Because no method has been devised by which they can be assayed chemically. Their potency and great usefulness de-

mand that some standard be established for their rather uniform therapeutic activity.

Q.—How many biologically assayed tinctures are official?
A.—Five.

Q.—Name them.
A.—Tinctura Aconiti, Cannabis, Digitalis, Scillæ and Strophanthi.

Q.—Just what is meant by a biologically assayed tincture?
A.—A tincture whose potency or activity has been determined by administration to some certain animal, and the dose adjusted to correspond to the selected standard.

Q.—Is the same kind of animal used to standardize all the tinctures, so assayed?
A.—No, the one is selected which has been found to be easily affected by the particular drug.

Q.—What animals are used?
A.—Dogs, guinea pigs, frogs.

Q.—Name the compound tinctures of the U. S. P.
A.—Tinctura Benzoini Composita.
Cardamomi Composita.
Cinchonæ Composita.
Gambir Composita.
Gentianæ Composita.
Lavandulæ Composita.
Opii Camphorata.
Rhei Aromatica.

Q.—Name the tinctures extracted with water alone.
A.—Tinctura Kino, Opii, Opii Deodorati.

Q.—Do these finished tinctures contain any alcohol?
A.—Yes, it is necessary to prevent fermentation.

Q.—Name those tinctures containing glycerin.
A.—Tinctura Cardamomi Composita.
Cinchonæ.
Cinchonæ Composita.
Cinnamomi.
Gentianæ Composita.
Lactucarii.

Opii Camphorati.
Rhei.
Rhei Composita.

Q.—Why is glycerin used in the tinctures?
A.—To dissolve and extract astringent principles and to hold in solution matter which would precipitate after extraction, due to complex menstruum.

Q.—Name the tinctures in which benzin is used.
A.—Tinctura Lactucarii, Opii Deodorati, Strophanthus.

Q.—Why is it used in Tr. Lactucarii?
A.—To dissolve out lactucerin.

Q.—Why is it used in Tr. Opii Deodorati?
A.—To dissolve out a caoutchouc-like principle which causes headache and nausea.

Q.—Why is it used in Tr. Strophanthus?
A.—To dissolve out a fixed oil or fat.

Q.—Name those tinctures extracted with Aromatic Spt. Ammonia.
A.—Ammoniated Tincture Guaiac and Ammoniated Valerian.

Q.—Which tincture has acid in the menstruum?
A.—Tr. Sanguinaria.

Q.—What is the acid for?
A.—It makes the alkaloids more soluble and tends to prevent precipitation.

Q.—What is the common name for Tr. Sanguinaria?
A.—Tr. Bloodroot.

Q.—Name those tinctures which are prepared by the use of heat.
A.—Tr. Cantharidis, Tr. Kino.

Q.—Why is heat used in preparing Tr. Cantharidis?
A.—The powder is digested in alcohol to more completely extract the cantharidin the active constituent.

Q.—Why is heat used in preparing Tr. Kino?
A.—Primarily to destroy a ferment which causes the tincture to gelatinize.

Q.—How must this tincture be stored?

A.—In small, tightly-stoppered bottles, in a cool place.

Q.—What was the strength of this tincture in U. S. P. VIII?

A.—5%.

Q.—What 5% tincture is now official?

A.—**Tr. Moschi.**

Q.—Describe Type Process P for making tinctures.

A.—The powdered drug is moistened then placed in a percolator and allowed to stand well covered for 6 hours; then it is packed firmly unless otherwise directed and enough menstruum poured on to saturate the powder and leave a stratum above. When the liquid begins to drop, close the lower orifice, cover the percolator and allow it to macerate for 24 hours. Then allow the percolation to proceed slowly, pouring on more menstruum until the required quantity of tincture is obtained.

Q.—How is the process modified for the assayed tinctures?

A.—It is carried on in exactly the same manner, except that only 95% of the tincture is collected, a sample of this is assayed and the quantity of alkaloid in the remainder of the liquid determined, then sufficient of the original menstruum added to make the finished tincture up to the pharmacopœial strength.

Q.—Describe Type Process M for making tinctures.

A.—The powdered drug is macerated with 75% of the menstruum in a well-stoppered container in a warm place for three days, the container being frequently shaken. It is then filtered and when the liquid has drained off the residue on the filter is washed with sufficient menstruum to make the required quantity.

Q.—What class of drugs is extracted by maceration?

A.—Resins, balsams and gum-resins.

Q.—How should tinctures be stored?

A.—In tightly-stoppered bottles, kept in a cool place, protected from the light.

Q.—Is the precipitate which is sometimes seen in the bottles of any value?

A.—No, it is generally inert matter which may be removed by filtration.

Q.—What causes it to precipitate?

A.—Exposure to the light and contact with the air.

Q.—How many drops per minute should flow when the U. S. P. directs to percolate "slowly"?

A.—In the case of tinctures, about 20 drops.

Q.—What process is used for assaying the tinctures?

A.—Immiscible solvents and titration.

Q.—How is this carried out?

A.—A specified quantity of the tincture is evaporated to a small volume, then 10 mils of distilled water and 2 mils of ammonia water are added in a separator. This is for the purpose of liberating the alkaloids. Now the mixture is repeatedly shaken with chloroform to get the alkaloids into solution in the chloroform, the free alkaloid being soluble in chloroform, but not in water. Next is added a weak solution of sulphuric acid in water. Here is where the name "immiscible solvents" enters, as the water and the chloroform will not mix. Repeated shaking now changes the free alkaloid in chloroformic solution to salts of the alkaloid (sulphate) which in turn is soluble in water but not in chloroform. This is drawn off and ammonia added again, which sets free the alkaloid and again chloroform is used to dissolve the alkaloid. Now the chloroform is evaporated and the free alkaloid so obtained is dissolved in a carefully measured volume of N/10 H_2SO_4 V. S. and the excess of acid is titrated with N/50 KOH V. S. Each mil of the acid which has been consumed corresponds to a definite weight of alkaloid.

Q.—Is every one of the assay processes like this?

A.—Not exactly but they all follow along the same lines.

Q.—Are water and chloroform the only liquids used in the extraction for assaying?

A.—No, alcohol, ether, amyl alcohol, benzene, petroleum benzin or mixtures of several of these may be used as the individual case requires.

Q.—Where may these directions be found?

A.—Under "General Tests No. 15, Proximate Assays," pages 593–6, Part II, U. S. P.

Q.—Name a tincture for which two assay processes are official.

A.—Tinctura Aconiti.

Q.—What are the requirements in each assay process?

A.—It must contain in 100 mils not less than 0.045 and not more than 0.055 Gm. ether-soluble alkaloids. And in the bio-

logical assay the minimum lethal dose must not exceed 0.0004 mil per Gm. body weight of guinea pig.

Q.—What is meant by the letters M. L. D. in connection with biological assay processes?

A.—They stand for Minimum Lethal Dose, meaning the smallest quantity of the preparation which will cause death.

Q.—What is the standard for Tr. Digitalis?

A.—The M. L. D. is not to exceed 0.006 mil per Gm. body weight of frog.

Q.—What other tinctures are assayed on the frog?

A.—Tr. Scillæ and Strophanthus.

Q.—What is the requirement for Tr. Squill?

A.—The M. L. D. must not exceed 0.006 mil per Gm. body weight of frog.

Q.—What are the requirements for Tr. Strophanthus?

A.—The M. L. D. must not exceed 0.00006 mil per Gm. body weight of frog.

Q.—What is the assay process for Digitalis-Squill-Strophanthus commonly called?

A.—The "one hour frog method."

Q.—Just what does this mean?

A.—Ascertaining the dose which will bring the heart of a standard-sized frog to systolic standstill within one hour after administration.

Q.—What sized frogs are used?

A.—Those weighing from 15 to 25 Gm.

Q.—At what temperature are the frogs stored?

A.—15° C.

Q.—At what temperature are they kept during the assay?

A.—At 20° C.

Q.—How is the preparation treated if it contains more than 20% alcohol, before being injected into the frog?

A.—It is carefully evaporated, then diluted with a 0.7% solution of sodium chloride in water.

Q.—May the resistance in frogs change from time to time?

A.—Yes, there is a difference in different series of frogs and their resistance is greater at one time of the year than at another.

Q.—How then is it possible to have a standard at all times for the preparations?
A.—Ouabain has been selected as the standard substance.

Q.—What is Ouabain?
A.—It is crystalline glucoside obtained from the seed of Strophanthus gratus or from the wood of Acocanthera Ouabaio.

Q.—What is the standard dose?
A.—0.0000005 Gm. per Gm. body weight of frog.

Q.—What is the reason for selecting Ouabain?
A.—It has a very high potency and may be had in absolute purity because of its crystalline form.

Q.—On what animal is Tr. Cannabis standardized?
A.—The dog.

Q.—What is the standard?
A.—A dose of 0.3 mil should produce incoordination for each Kilogram body weight of dog.

Q.—What is meant in this case by incoordination?
A.—Staggering or swaying when the dog stands or attempts to walk.

Q.—What is the alkaloidal requirement for **Tr. Belladonnæ Foliorum?**
A.—0.027 to 0.033 Gm. total alkaloids in 100 mils.

Q.—What is the principal alkaloid in Belladonna?
A.—Atropine.

Q.—What therapeutic action does this alkaloid have?
A.—It is a mydriatic.

Q.—What does mydriatic mean?
A.—Having the power to dilate the pupil of the eye.

Q.—What are the alkaloidal requirements for **Tr. Cinchonæ?**
A.—0.8 to 1. Gm. total alkaloids in 100 mils.

Q.—Is this tincture made from the yellow or red Cinchona?
A.—From the yellow Cinchona.

Q.—What is a common name for Cinchona?
A.—Peruvian bark.

Q.—What are the requirements for **Tr. Cinchona Comp?**
A.—0.4 to 0.5 Gm. total alkaloids in 100 mils.

Q.—What is the common name for this tincture?
A.—Huxham's tincture (of bark).

Q.—What is the principal alkaloid in Cinchona?
A.—Quinine.

Q.—What others are fairly common?
A.—Cinchonine, cinchonidine, quinidine.

Q.—What Cinchona is used in making the Compound Tincture?
A.—Red cinchona.

Q.—What else is there in the Compound Tincture?
A.—Bitter orange peel and serpentaria.

Q.—What are the requirements for **Tr. Colchicium Seed?**
A.—0.036 to 0.044 Gm. colchicine in 100 mils.

Q.—Is this a very potent tincture?
A.—Yes, and overdose is extremely dangerous.

Q.—What is it therapeutically?
A.—Alterative and antirheumatic.

Q.—What is the strength of **Tr. Ferric Chloride?**
A.—4.48% of metallic iron.

Q.—What is it made from?
A.—35% of solution of ferric chloride and 65% alcohol.

Q.—How should it be stored?
A.—In amber-colored, glass-stoppered bottles, protected from the light.

Q.—Why must it be protected from the light?
A.—Light tends to reduce it to ferrous iron.

Q.—What other impurity does the U. S. P. give a test for?
A.—Nitric acid.

Q.—How can this acid enter the Tincture?
A.—In making the Sol. Ferric Chloride, nitric acid is used to oxidize ferrous chloride to ferric chloride.

Q.—What is the test for nitric acid?
A.—To a mixture of equal volumes of strong sulphuric acid and the diluted tincture, add a clear crystal of ferrous sulphate and if the crystal turns brown, or a brownish-black ring develops, there is nitric acid present.

Q.—What is the explanation of the brown color?
A.—The oxidizing action of the nitric acid converts the ferrous sulphate crystal which is green to the ferric sulphate which is brownish.

Q.—How long should the tincture be kept before use?
A.—At least three months.

Q.—Why is this desirable?
A.—Ethers and esters develop through reaction between the alcohol and acid (HCl).

Q.—Why are these of value in the tincture?
A.—They make the tincture more readily assimilated.

Q.—What precaution should be advised in taking mixtures containing Tr. Ferric Chloride?
A.—To take through a glass tube so it will not come in contact with the teeth as the acid and the iron are likely to attack and discolor them.

Q.—What further precaution should be observed?
A.—To afterward rinse the mouth with an alkaline wash.

Q.—What are the requirements for **Tr. Hydrastis?**
A.—0.36 to 0.44 Gm. ether-soluble alkaloids in 100 mils.

Q.—What alkaloids are there in Hydrastis?
A.—Hydrastine and berberine.

Q.—What is the common name for Hydrastis?
A.—Golden seal.

Q.—What are the requirements for **Tr. Hyoscyamus?**
A.—0.0055 to 0.0075 Gm. alkaloids in 100 mils.

Q.—What is the common name for Hyoscyamus?
A.—Henbane.

Q.—What is the strength of **Tr. Iodine?**
A.—7% of iodine.

Q.—What else is there in the tincture?
A.—5% potassium iodide and a little water, alcohol.

Q.—What is the water for?
A.—To dissolve the potassium iodide.

Q.—What is the potassium iodide for?
A.—To keep the iodine from reacting chemically with the alcohol, thus lowering the iodine strength of the tincture.

Q.—Does it aid in dissolving the Iodine?

A.—No, the iodine is three times more soluble in the alcohol than the potassium iodide.

Q.—Is the tincture assayed for both these salts?

A.—Yes, iodine 6.5 to 7.5 Gm. and KI 4.5 to 5.5 Gm. in 100 mils.

Q.—What use is made of Tr. Iodine?

A.—It is used to paint morbid swellings for the purpose of reducing them. As a counter-irritant. Largely as an antiseptic or germicide particularly in dressings wounds, it is a household remedy in this particular.

Q.—Is it poisonous?

A.—Yes, and should always have a poison label.

Q.—What is the antidote?

A.—Emetic and plenty of starch-water. Stomach tube. Tr. Opium to allay pain.

Q.—What are the requirements for **Tr. Nux Vomica?**

A.—0.237 to 0.263 Gm. total alkaloids in 100 mils.

Q.—How is the tincture prepared?

A.—By percolation with a menstruum of 3 volumes of alcohol and 1 volume of water.

Q.—How was it prepared in U. S. P. VIII?

A.—By dissolving the official extract of nux vomica in a menstruum of the above proportions.

Q.—What are the principal alkaloids in nux vomica?

A.—Strychnine and brucine.

Q.—What rate of flow does the U. S. P. direct in this extraction?

A.—Ten drops a minute.

Q.—What are the requirements for **Tr. Opium?**

A.—0.95 to 1.05 Gm. anhydrous morphine in 100 mils.

Q.—What kind of opium is used in making this tincture?

A.—Granular opium.

Q.—How is the extraction made?

A.—Boiling water is poured on the opium and allowed to stand for 12 hours, at the end of which time water is added to restore original weight. Then an equal volume of alcohol is added and maceration continued for 48 hours with occasional shaking.

Then transferred to a percolator and the liquid returned until it comes through clear, then diluted alcohol used to extract to desired volume.

Q.—What is the synonym for Tr. Opium?
A.—Laudanum.

Q.—What is it therapeutically?
A.—Anodyne and hypnotic.

Q.—What is the dose?
A.—0.5 mil.

Q.—What is the antidote for poisoning by Tr. Opium?
A.—Strong black coffee. Stomach pump. Above all do not permit the patient to doze or sleep.

Q.—What is the assay requirement for **Tr. Opii Deodorati?**
A.—0.95 to 1.05 Gm. anhydrous morphine in 100 mils.

Q.—How is the extraction made?
A.—50% of boiling water is poured onto the opium and allowed to macerate for 24 hours. It is then transferred to a percolator and the percolate returned to the percolator until it runs through clear and the percolation with water continued until the opium is exhausted.

Q.—How is it deodorized?
A.—The percolate is reduced on the water-bath to 15% of the finished product. It is then shaken with two portions of purified petroleum benzin. The benzin being separated and rejected.

Q.—Is there any alcohol added to the tincture?
A.—Yes, after all the benzin odor has been driven off the liquid is filtered and 20% of alcohol is added.

Q.—What is extracted by the benzin?
A.—A caoutchouc or rubber-like principle.

Q.—Why is it desirable to have a Deodorized Tincture of Opium?
A.—The principle which is dissolved out by the benzin is the cause of the nausea, headache and bad after-effects of the administration of opium. Hence all of this is eliminated by the administration of the deodorized tincture.

Q.—What are the requirements for **Tr. Physostigma?**
A.—0.013 to 0.017 Gm. alkaloids in 100 mils.

Q.—What is the dose?
A.—1 mil.

Q.—What are the requirements for **Tr. Stramonium?**
A.—0.0225 to 0.0275 Gm. total alkaloids in 100 mils.

Q.—To what class of tinctures does this belong?
A.—The mydriatics.

Q.—What is the dose?
A.—0.5 mil.

Q.—In what particular does the preparation of **Tr. Lactucarium** differ from the preparation of any other tincture of the U. S. P.?
A.—In the extraction 75% of the first percolate is set aside as a reserve, then percolation is continued to exhaustion. The weak percolate is evaporated on the water-bath to 25% of the finished tincture then mixed with the reserve.

Q.—How is **Tr. Arnica** prepared?
A.—20% of the drug and dilute alcohol are used. The drug is moistened with half the menstruum and macerated for 24 hours, then percolated until 25% of percolate is obtained. Percolation is then stopped and macerated for another 24 hours, then percolated until an additional 25% is collected and again interrupted and macerated for 12 hours. Then percolate and collect another 25%, then interrupt again and macerate 12 hours, then percolate and collect the final 25%.

Q.—What are the common names for **Tr. Benzoin Comp?**
A.—Friar's Balsam, Turlington's Balsam, Jesuit Balsam.

Q.—What is there in **Tr. Opii Camphorata?**
A.—0.4% each Powd. Opium, benzoic acid, camphor and oil of anise, 5% glycerin and the balance is dilute alcohol.

Q.—What is the synonym?
A.—Paregoric.

N. F. TINCTURES

Q.—How many tinctures official in the N. F.?
A.—48.

Q.—What two classes official differ from any in the U. S. P.?
A.—Ethereal tinctures and Tinctura Medicamentorum Recentium or tinctures of fresh herbs.

Q.—How are ethereal tinctures prepared?
A.—By percolation, using a menstruum of one volume of ether and two volumes of alcohol, taking care to prevent loss of the volatile menstruum and percolate.

Q.—How are the tinctures of fresh herbs prepared?
A.—The fresh herb is contused and macerated in a moderately warm place for two weeks with strong alcohol, with occasional stirring, then express strongly and filter through paper.

Q.—How do the strengths of the N. F. tinctures vary?
A.—From 6% to 50%.

Q.—What is the difference in the preparing of an N. F. tincture by maceration and one in the U. S. P.?
A.—The N. F. tincture macerates for 7 days and the U. S. P. for 3 days.

Q.—How is **Ethereal Tincture of Ferric Chloride** made?
A.—6% of solution of ferric chloride is mixed with 65% of alcohol, then 25% of ether is added, then enough alcohol to make 100%. The tincture is poured into flint glass bottles and set in the sunlight until the yellow color has disappeared, then it is removed from the sunlight and the stopper taken out until the tincture has regained its yellow color. It is stored in a dark cool place.

Q.—What tincture is made by dissolving an official extract?
A.—**Tinctura Ferri Pomata.**

Q.—What is its strength?
A.—10%.

Q.—What is the menstruum?
A.—Alcohol 10%, balance Cinnamon Water.

Q.—Name the two assayed tinctures of the N. F.
A.—Tinctura Ignatia and Opii Crocata.

Q.—What are the assay requirements of Tr. Ignatia?
A.—0.18 to 0.22 Gm. alkaloids in 100 mils.

Q.—What is the principal alkaloid in this tincture?
A.—Strychnine.

Q.—How is it prepared?
A.—By percolation with a menstruum of 8 volumes of alcohol and 1 volume of water. The first 80% of percolate is reserved

and percolation continued to exhaustion, the weak evaporated to 10% which is mixed with the reserve and the tincture assayed. It is then adjusted so that each 100 mils will contain 0.2 Gm. alkaloids by adding sufficient of the original menstruum.

Q.—What are the assay requirements for **Tr. Opium with Saffron?**
A.—0.95 to 1.05 Gm. anhydrous morphine in 100 mils.

Q.—How much saffron does it contain?
A.—2.5%.

Q.—What else is in it?
A.—0.6% each saigon cinnamon and clove.

Q.—What is the synonym?
A.—Sydenham's laudanum.

Q.—What is the English name for **Tr. Persionis?**
A.—Tincture of cudbear.

Q.—What is it used for?
A.—Only for coloring other preparations.

Q.—What other coloring tinctures in the N. F.?
A.—Tr. Caramelis, and Persionis Composita.

Q.—What Iodine tincture is official in the N. F.?
A.—**Tinctura Iodi Fortior.**

Q.—What is the synonym?
A.—Churchill's tincture of iodine.

Q.—What is its strength?
A.—16.5% of iodine.

Q.—What else does it contain?
A.—3.3% potassium iodide, 25% water and the balance is alcohol.

Q.—What is the potassium iodide for?
A.—To aid in the dissolving of the iodine.

Q.—Was it in the U. S. P. tincture for this purpose?
A.—No, it was pointed out that the iodine is much more soluble in alcohol than potassium iodide.

Q.—Why then can it be said to be present in the N. F. tincture to aid solution of iodine?
A.—Because in the N. F. tincture there is 25% of water which materially changes the nature of the solvent.

Q.—What other so-called iodine tincture is in the N. F.?
A.—Tinctura Iodi Decolorata.

Q.—Is it an iodine tincture?
A.—No, only so far as it may be called one because iodine does enter into its making.

Q.—What else is used in preparing this tincture?
A.—Sodium thiosulphate 8.3%, stronger ammonia water 6.5%, water 10% and alcohol.

Q.—What really occurs when the iodine is deprived of its color by the action of the sodium thiosulphate and stronger ammonia water?
A.—The iodine is converted into sodium iodide and ammonium iodide.

Q.—What is the precipitate which forms?
A.—Said to be sodium tetrathionate and some free sulphur.

Q.—How is **Tr. Quillajæ** prepared?
A.—By decoction.

Q.—Is there any alcohol in the preparation?
A.—Yes, 35% to prevent fermentation.

Q.—Give the details of preparation.
A.—After boiling 15 minutes it is strained while still hot, then wash the residue on the strainer with 20% of boiling water, evaporate the strained liquid to 60% of the required volume. Let cool, add the alcohol and set aside for 12 hours. Decant the supernatant liquid, filter it, then pour the residue on the filter and when the liquid ceases to drop wash the filter with enough water to make the 100%.

Q.—What is a common name for the tincture?
A.—Tincture of soap-tree bark.

Q.—Name the 25% tincture of the N. F.
A.—Tr. Ergotæ Ammoniata.

Q.—Name the 50% tincture.
A.—Tr. Cacti Grandiflori.

Q.—What is the synonym?
A.—Tr. night-blooming cereus.

Q.—What is it therapeutically?
A.—A cardiac tonic.

Q.—What is the dose?
A.—1 mil.

Q.—What are common names for **Tr. Aloes and Myrrh?**
A.—Elixir ad langam vitum. Elixir Paracelcus.

Q.—What is a synonym **for Tr. Antiperiodica?**
A.—Warburg's tincture.

Q.—How many ingredients are there in it?
A.—16 besides the alcohol and water.

Q.—What other form of the tincture is official?
A.—Warburg's tincture without aloes.

Q.—What is the dose?
A.—From 4 to 15 mils.

Q.—What are the principal ingredients of the tincture?
A.—Quinine bisulphate 2%, extract of aloes 1.75%.

Q.—What are the synonyms for **Tr. Capsicum and Myrrh?**
A.—Hot drops. Number six. Thomsonian number six.

Q.—How is this percolated?
A.—By mixing the solids with an equal weight of clean white sand.

Q.—Why is this necessary?
A.—The resinous nature of the drugs makes it difficult for the menstruum to pass through the powder.

Q.—How is **Tr. Ferric Citro-Chloride** prepared?
A.—35% solution of ferric chloride is mixed with 15% of water and 44% of sodium citrate dissolved in the mixture by the aid of gentle heat. When cold add 15% of alcohol and enough water to make 100%. Set aside to allow saline matter to precipitate, then filter.

Q.—What is the color of this tincture?
A.—Deep green.

Q.—Is it a ferrous preparation?
A.—No.

Q.—Then how is the green color explained?
A.—This is characteristic of preparations made by mixing ferric solutions with alkaline solutions, if they are not alkaline hydroxides.

Q.—How does this tincture react with tannin-bearing preparations?
A.—The characteristic iron reaction is entirely absent and there is no coloration either.

Q.—What are the synonyms?
A.—Tasteless tincture of ferric chloride. Tasteless tincture of iron.

Q.—How does it compare with the U. S. P. Tr. Ferric Chloride?
A.—It has the same amount of iron but has less than ¼ as much alcohol.

Q.—What is the common name for **Tr. Ipecac and Opium?**
A.—Tincture of Dover's powder. Dover's tincture.

Q.—What form of opium is used to make this tincture?
A.—Deodorized tincture of opium.

Q.—How many parts are used?
A.—100 parts.

Q.—How many parts and what form of ipecac is used?
A.—10 parts of the fluidextract.

Q.—How then is the tincture made into 100 parts?
A.—The deodorized tincture of opium is put into a tared evaporating dish and evaporated until it is reduced to 70 parts **by weight**, then the ipecac is added and the mixture filtered and the filter washed with sufficient dilute alcohol to make 100 parts by volume.

Q.—What is the dose?
A.—0.5 mil.

Q.—What is the synonym for **Tr. Guaiaci Composita?**
A.—Dewee's tincture of guaiac.

Q.—What form of opium is used in making **Tr. Kino and Opium?**
A.—10% of Tr. Opium.

Q.—What are the synonyms for **Tr. Pectoralis?**
A.—Guttæ Pectorales. Pectoral Drops. Bateman's Pectoral Drops.

Q.—What potent ingredients does it contain?
A.—Tr. Opium, 4.2%.

Q.—Why is the Potassium carbonate in **Tr. Rhei Aquosa?**
A.—It saponifies the resins of the rhubarb so they will mix clear in the tincture.

Q.—Why is there no Potassium Carbonate in **Tr. Rhei Dulcis?**
A.—Because of the large proportion of alcohol and the glycerin in the menstruum. These dissolve the resins without cloudiness.

Q.—What percentage of Rhubarb in each of these tincts?
A.—10%.

FLUIDEXTRACTA—FLUIDEXTRACTS

Q.—Define Fluidextracts.
A.—Concentrated liquid preparations of vegetable drugs containing alcohol either as a solvent or as a preservative and bearing a uniform relation to the drug used so that one mil of the fluidextract closely represents the activity of one gram of the air-dried and powdered drug of standard quality.

Q.—How many are official?
A.—49 in the U. S. P. and 90 in the N. F.

Q.—What liquids are used in preparing them?
A.—Water, alcohol, glycerin, hydrochloric acid, acetic acid and ammonia water.

Q.—How are they prepared?
A.—According to four Type Processes.

Q.—How are these Type Processes designated?
A.—Type Process A, Type Process B, Type Process C, and Type Process D.

Q.—Describe Type Process A.
A.—The powdered drug is moistened with a sufficient quantity of the prescribed menstruum, which is either alcohol or a mixture of alcohol and water, to render it distinctly damp and maintain it so for 6 hours. It is then packed in a cylindrical percolator and enough menstruum poured on to saturate the powder and leave a stratum above. It is allowed to macerate for 48 hours. Then percolation is allowed to proceed slowly and the first 85% of the percolate is set aside as reserve and percolation continued to exhaustion. The weak percolate is evaporated

to a soft extract at a temperature not exceeding 60° C. and dissolved in the reserve. It is then made up to 100% by the addition of the original menstruum.

Q.—Why is the first 85% of percolate set aside?

A.—Because it contains a large proportion of the active constituents of the drug and this will not be subjected to the action of heat when the percolate is concentrated.

Q.—What is Type Process B?

A.—This includes those made with two menstrua. The first containing glycerin or acid which is used to moisten and macerate the drug, then one of alcohol and water to finish the extraction. Otherwise the method is exactly the same as Type Process A.

Q.—What is Type Process C?

A.—This is a fractional percolation method. The drug is divided into three parts, 50%, 30%, and 20%. The 50% is moistened, macerated, and packed in the usual way, and 20% mils of percolate collected and set aside, then percolation is continued 150% mils of weak percolate, in 5 lots of 30% each is obtained. Now treat the second portion (30%) of the drug in the same manner as the first, using the weak percolate obtained, in the order in which it was collected. Reserve the first 30% mils from this lot, then continue percolation until 80% mils of weak percolate have been obtained in 4 lots of 20 each. Now take the third portion of the drug, 20% and moisten, pack and macerate in the same manner collecting 50% mils of percolate, using the weak percolate obtained from the second lot of drug to exhaust with. If this is not sufficient use some of the original menstruum. Now mix the three reserve portions 20%, 30%, and 50% which makes 100% of finished fluidextract.

Q.—What is the advantage of this method?

A.—It exhausts the drug volume for weight without subjecting any portion of the percolate to the action of heat.

Q.—When is it of especial use?

A.—When the drug to be extracted has volatile constituents or are likely to be injured by exposure to heat. It may also be used as an alternative process for Type Process A.

Q.—How is this modified for assayed fluidextracts?

A.—Only 42% mils of percolate are collected from the third portion of the drug.

Q.—What is Type Process D?
A.—This includes those fluidextracts made by infusion and percolation.

Q.—How is it carried out?
A.—100 parts of the drug are infused with 500 parts of boiling water for 2 hours in a warm place. It is then transferred to a metallic or enameled percolator and boiling water added until the drug is extracted. The percolate is then evaporated on a water-bath or steam-bath to definite volume, alcohol is then added and the preparation made up to 100% by the addition of water.

Q.—Do all Type Process D fluidextracts contain alcohol?
A.—Yes, it is necessary to prevent fermentation.

Q.—How many are made by Type Process A?
A.—28.

Q.—How many by Type Process B?
A.—11.

Q.—How many by Type Process C?
A.—3.

Q.—How many by Type Process D?
A.—3.

Q.—How are the remainder of the 49 made?
A.—Each by a special process adapted to the individual drug.

Q.—Name those made by special process?
A.—Fluidextractum Cascaræ Sagradæ Aromaticum, Glycyrrhizæ, Scillæ, Senegæ.

Q.—Which three have an alkali in menstruum?
A.—Fluidextractum Cascaræ Sagradæ Aromaticum, Glycyrrhizæ, Senegæ.

Q.—What alkali is used in **Fluidextract Cascara Sagrada Aromatic?**
A.—Magnesium Hydroxide.

Q.—How is the Hydroxide made?
A.—By mixing Magnesium Oxide with boiling water.

Q.—What is the object of the alkali here?
A.—It reacts with the bitter principle in the bark and destroys the bitterness.

Q.—How long is it allowed to macerate with the boiling water and magnesium hydroxide?

A.—Two hours.

Q.—How is it then exhausted?

A.—With boiling water.

Q.—How much is the percolate concentrated?

A.—To 50% of the finished fluidextract.

Q.—What is then added?

A.—4% pure ext. glycyrrhiza.

Q.—What else is added?

A.—20% glycerin and 25% alcohol in which have been dissolved, a little benzosulphonide, oils of anise, cassia, coriander, and methyl salicylate.

Q.—What is it finally made up with?

A.—With water.

Q.—What is it therapeutically?

A.—Laxative and tonic.

Q.—What is the dose?

A.—2 mils.

Q.—What alkali is used in **Fluidextractum Glycyrrhizæ?**

A.—Ammonia water.

Q.—How much?

A.—10%.

Q.—What else is used in the process of extraction?

A.—Chloroform water.

Q.—Is the first 10% mentioned, all the ammonia water used in the extraction?

A.—Not necessarily, it may be used in the initial proportion of 1 part to 3 parts of chloroform water until the drug is extracted.

Q.—How long is the drug macerated before percolation?

A.—48 hours.

Q.—What is the menstruum used in the process of moistening, macerating and exhausting?

A.—A mixture of 1 part ammonia water and 3 parts chloroform water, first made up in a quantity 3 times that of the finished fluidextract.

Q.—Why is the chloroform water used?
A.—Because it is antiseptic and prevents mold and fermentation during the process.

Q.—What is the strength of Chloroform Water?
A.—0.5% of Chloroform.

Q.—Why is it not made stronger?
A.—Because the chloroform is soluble only to this extent in water.

Q.—Is chloroform then contained in the finished product?
A.—Probably not as it is quite volatile and the original quantity is small.

Q.—What is the active constituent in Glycyrrhiza?
A.—Glycyrrhizin.

Q.—To what class of substances does it belong?
A.—Said to be a glucoside.

Q.—Why is ammonia water used in this Fluidextract?
A.—It makes the glycyrrhizin more soluble so it can be more readily extracted.

Q.—Does this have any effect on the taste?
A.—Glycyrrhizin is a sweet principle and as the ammonia water combines with it to make a more soluble compound, it is of course sweeter.

Q.—How is the fluidextract finished?
A.—The first 50% of percolate is set aside as reserve, the weak percolate is evaporated to a soft extract dissolved in the reserve and enough water added to make 75%, a few drops of ammonia water being added to facilitate solution, then 25% alcohol. Allow to stand for 7 days in a stoppered container, then decant the clear liquid, filter the remainder and wash the residue on the filter with a mixture of 1 volume of alcohol and 3 volumes of water to make 100%.

Q.—What is the common name for the preparation?
A.—Fluidextract of Licorice.

Q.—What particular use is made of it?
A.—To disguise the bitter taste of medicines, particularly quinine and its derivatives.

Q.—With what is it incompatible?
A.—With acid mixtures, as acid will precipitate the glycyrrhizin.

Q.—Into what U. S. P. preparation does it enter?
A.—Elixir Glycyrrhizæ.

Q.—What was this preparation called in the 8th Revision?
A.—Elixir Adjuvans.

Q.—What alkali is used in **Fluidextractum Senegæ?**
A.—Ammonia water.

Q.—What is the menstruum used in making the extraction?
A.—2 parts of alcohol and 1 part of water.

Q.—Is this used all the way through?
A.—Yes.

Q.—Does the process differ from the ordinary methods?
A.—Yes, only 80% of reserve is collected.

Q.—When is the ammonia water added?
A.—After the concentrated extract has been dissolved in the reserve.

Q.—How much is used?
A.—Just sufficient to render the liquid slightly alkaline and give a slight odor of ammonia.

Q.—Why is it used?
A.—Senega contains an acid principle which gelatinizes, and the ammonia neutralizes this and keeps it in solution.

Q.—Into what U. S. P. preparations does this enter?
A.—Syrupus Senegæ and Syr. Scillæ Compositus.

Q.—What is the dose of the Fluidextract?
A.—1 mil.

Q.—What liquids are used in making **Fluidextractum Scillæ?**
A.—Only water and alcohol.

Q.—In what proportion are they mixed?
A.—2 parts of alcohol and 1 part water.

Q.—How long does it stand after moistening?
A.—Only two hours.

Q.—Is it then packed in the percolator?

A.—It is transferred to a percolator and shaken down, but not packed.

Q.—Why is it not packed?

A.—It contains so much albuminous matter that it packs so tightly the menstruum will not penetrate it.

Q.—How long is it allowed to macerate?

A.—48 hours.

Q.—Is it then exhausted at once?

A.—No, it is allowed to percolate slowly until 100 parts of percolate are obtained, then stopped and macerated again for 12 hours, then another 100 parts of percolate collected, again interrupted and macerated for 12 hours, then collect sufficient percolate to make in all 500 parts.

Q.—How is the Fluidextract finished?

A.—The alcohol is recovered at as low a temperature as possible, then the balance is reduced to 80 parts. When cold, add with constant stirring 200 parts of alcohol and set away in a tightly stoppered vessel for 12 hours. Decant the supernatant liquid from the syrupy layer; filter the decanted liquid and wash the syrupy residue with two portions of 30 parts each of a mixture of 4 volumes of alcohol and 1 volume of water, into the previously collected alcoholic liquid. Reduce to 80 parts by distillation and make up to 100 with dilute alcohol.

Q.—What is the standard for this Fluidextract?

A.—The M.L.D. should not be greater than 0.0006 mil per Gm. body weight of frog or the equivalent of 0.0000005 Gm. ouabain per Gm. body weight of frog.

Q.—What is the average dose?

A.—0.1 mil.

Q.—What is it therapeutically?

A.—Expectorant, diuretic, cardiac tonic.

Q.—What U. S. P. preparation does it enter?

A.—Syrupus Scillæ Compositus.

Q.—Name the Fluidextracts extracted with acid menstrua.

A.—Flext. Cinchonæ, Ergotæ, Ipecacuanhæ, Lobeliæ.

Q.—What Acid is used in **Fluidextractum Cinchonæ?**

A.—Diluted hydrochloric acid.

Q.—Why is it used?
A.—It makes the alkaloids more readily soluble hence more easily extracted.

Q.—What are the principal alkaloids in Cinchona?
A.—Quinine, quinidine, cinchonine, cinchonidine.

Q.—What is it therapeutically?
A.—Antiperiodic, tonic.

Q.—What is the dose?
A.—1 mil.

Q.—What acid is used in **Fluidextractum Ergotæ**?
A.—Hydrochloric acid.

Q.—Why is it used?
A.—To make the alkaloids more soluble and to prevent volatilization. It is also said to cause the more ready precipitation of an inert resinous constituent.

Q.—What is this Fluidextract therapeutically?
A.—Hæmostatic. Stimulant to involuntary muscles.

Q.—What is the dose?
A.—2 mils.

Q.—By what title is this preparation known in the International Protocol?
A.—Secalis cornuti extractum fluidum.

Q.—What acid is used in the preparation of **Fluidextractum Ipecacuanhæ**?
A.—Dilute hydrochloric acid.

Q.—What is it for?
A.—To render the alkaloids more soluble.

Q.—What are the alkaloidal requirements?
A.—Each 100 mils must contain not less than 1.8 nor more than 2.2 Gm. of ether-soluble alkaloids.

Q.—What is the preparation therapeutically?
A.—Expectorant and emetic.

Q.—What is the expectorant dose?
A.—0.05 mil.

Q.—What U. S. P. preparation is made from it?
A.—Syrupus Ipecacuanhæ.

Q.—What acid is used in the preparation of **Fluidextractum Lobeliæ?**

A.—Acetic Acid.

Q.—Why is it used?

A.—Lobelia contains a liquid alkaloid, lobeline which is volatile, hence the acetic acid is used to form a stable salt.

Q.—What is the dose?

A.—0.15 mil.

Q.—Name the Fluidextracts which required alkaloidal assay.

A.—Fluidextracts Aconiti, Belladonnæ Radicis, Cinchonæ, Colchici Seminis, Guaranæ, Hydrastis, Hyoscyami, Ipecacuanhæ, Nucis Vomicæ, Pilocarpi.

Q.—Name those biologically assayed.

A.—Fluidextractum Aconiti, Cannabis, Digitalis, Scillæ.

Q.—What relation does the standard for the fluidextracts bear to the tinctures of the same drug?

A.—They are ten times stronger.

Q.—Does this same relation hold with the chemically assayed Fluidextracts and Tinctures?

A.—Yes, generally.

Q.—Name an exception to the above.

A.—**Fluidextract Hydrastis** is only 5 times stronger than the tincture.

Q.—Name 2 assayed fluidextracts from drugs which do not have officially assayed tinctures.

A.—Fluidextract Ipecac and Pilocarpus.

Q.—How does the Fluidextractum Belladonnæ Radicis compare in strength with the Tr. Belladonnæ Foliorum?

A.—It is about 15 times stronger.

Q.—Name those Fluidextracts which are extracted with water.

A.—Fluidextractum Cascaræ Sagradæ, Frangulæ, Tritici, Cascaræ Sagradæ Aromaticum and Glycyrrhizæ.

Q.—Is there any alcohol in any of these when finished?

A.—Yes, in all of them, to precipitate inert matter or to prevent fermentation.

Q.—Which one of the Fluidextracts has the drug first exhausted with Benzin?

A.—**Fluidextractum Colchici Seminis.**

Q.—What is this for?

A.—To remove a fixed oil.

Q.—How is the oil removed from **Fluidextractum Staphisagriæ?**

A.—By chilling the fluidextract and filtering through a filter moistened with alcohol.

Q.—Is this Fluidextract given internally?

A.—No, there is no dose mentioned in the U. S. P.

Q.—Why is the drug first moistened and allowed to stand for 6 hours or so before packing when Fluidextracts are being prepared?

A.—To cause the drug to swell, for if it were packed in the percolator at once it would swell there and to such an extent that the menstruum could not penetrate the drug.

Q.—Why is it then allowed to macerate 48 hours?

A.—To give the menstruum an opportunity to enter the cells and soften the active constituents of the drug so they may be more readily and completely extracted.

Q.—In making the fluidextracts how fast should the percolate drop?

A.—If made in 1000 mil quantities, 10 drops per minute until the reserve is collected, then 20 drops per minute.

Q.—What causes precipitates to form in fluidextracts?

A.—Usually caused by changes in temperature, also change in the nature of the extractive matter due to exposure to light and air.

Q.—Does the precipitate contain any of the valuable principles of the drug?

A.—No.

Q.—Should freshly made fluidextracts be given a chance to precipitate?

A.—Yes, they should be placed in tightly stoppered containers and allowed to stand undisturbed for a month, then if a precipitate has settled out, the clear liquid should be decanted and the balance filtered.

Q.—How should they then be stored?

A.—In amber-colored bottles tightly stoppered, protected from the light and in a place of uniform temperature.

Q.—Is it always possible to be sure of the alcoholic content of the fluidextract?

A.—No, some must be lost in the process of extraction; there is always a variable quantity of moisture in the air-dried drug even in different lots of the same drug.

Q.—How is the percentage of alcohol best determined?

A.—A process is given under No. 14 in Part II of the U. S. P.

N. F. FLUIDEXTRACTS

Q.—Name the N. F. fluidextracts.

A.—Fluidextractum:

Adonidis.
Aletridis.
Angelicæ Radicis.
Apii Fructi.
Ariliæ.
Apocyni.
Arnicæ Flori.
Asclepiadis.
Baptisiæ.
Berberidis.
Boldi.
Buchu Compositum.
Calendulæ.
Castaneæ.
Calumbæ.
Catariæ.
Caulophylli.
Chimaphilæ.
Chinonanthi.
Chiratæ.
Cinchonæ Aquosum.
Coccillanæ.
Coffeæ.
Colchici Cormi.
Condurango.
Conii.
Convallariæ Florum.
Convallariæ Radicis.
Coptis.
Corni.
Corydalis.
Cubebæ.
Cypripedii.
Damianæ.
Dioscoreæ.
Droseræ.
Dulcamaræ.
Echinaceæ.
Euonymi.
Eupatorii.
Euphorbiæ Piluliferæ.
Fuci.
Galegæ.
Geranii.
Gossypii Corticis.
Hamamelidis Foliorum
Helianthemi.
Heloniatis.
Humuli.
Hydrangeæ.
Iris Versicoloris.
Jalapæ.

Juglandis.
Juniperi.
Kavæ.
Kolæ.
Krameriæ.
Lappæ.
Leptandræ.
Lupulini.
Matico.
Mezerei.
Paracoto.
Pareiræ.
Petroselini Radicis.
Phytolaccæ.
Pruni Virginianæ.
Quassiæ.
Quercus.
Rhamni Catharticæ.
Rhois Glabræ.
Rubi.
Rumicis.
Sanguinariæ.
Scoparii.
Scutellariæ.
Senecionis.
Serpentariæ.
Solani.
Sterculiæ.
Stillingiæ Compositum.
Stramonii.
Thujæ.
Thymi.
Trifolii.
Trillii.
Turneræ.
Valerianæ.
Verbasci Foliæ.
Verbenæ.
Viburni Opuli.
Zeæ.

Q.—How many fluidextracts does the N. F. recognize?
A.—90.

Q.—Do they differ in any way from those of the U. S.P.?
A.—No.

Q.—Are any of the N. F. fluidextracts directed to be made by Process D?
A.—No, but Fluidextractum Castanæ is made by quite the same process.

Q.—What other two are made by special processes?
A.—**Fluidextractum Cinchonæ Aquosum and Pruni Virginianæ.**

Q.—How many of the 90 are made by Type Process A?
A.—73.

Q.—Are any N. F. fluidextracts biologically assayed?
A.—No, but a footnote indicates that **Fluidextractum Apocyni** may be so assayed.

Q.—What precaution is pointed out regarding this Fluidextract?

A.—That its absorption is uncertain and irregular. To avoid accumulation and toxic action the physician should carefully watch the effect of each dose on each patient.

Q.—In what other fluidextract is this same precaution directed?

A.—**Fluidextractum Euonymus.**

Q.—Name the N. F. Fluidextracts which are chemically assayed.

A.—Fluidextractum Cinchonæ Aquosum, Colchici Cormi, Conii and Stramonii.

Q.—What is the rubric for **Fluidextractum Cinchonæ Aquosum?**

A.—Not less than 4.5 nor more than 5.5 Gm. alkaloids in each 100 mils.

Q.—How much alcohol must it contain?

A.—Not less than 12%.

Q.—What are the requirements for **Fluidextractum Colchici Cormi?**

A.—Not less than 0.31 or more than 0.39 Gm. colchicine in each 100 mils.

Q.—What are the requirements for **Fluidextractum Conii?**

A.—Not less than 0.35 nor more than 0.45 Gm. coniine in each 100 mils.

Q.—What are the requirements for **Fluidextractum Stramonii?**

A.—Not less than 0.22 nor more than 0.28 Gm. of total alkaloids in each 100 mils.

Q.—What acid is used in making **Fluidextractum Cinchonæ Aquosum?**

A.—Hydrochloric Acid.

Q.—Why is it used?

A.—To make soluble salts of the alkaloids so they may be more completely extracted.

Q.—What kind of Cinchona is this Fluidextract made from?

A.—Red cinchona.

Q.—What acid is used in making **Fluidextract Conium?**
A.—Acetic acid.

Q.—Why is this used?
A.—The alkaloid coniine is liquid and volatile so acetic acid is used to make a stable salt which will not be lost in the process of extraction and concentration.

Q.—By what Type Process is **Fluidextractum Conii** made?
A.—Type Process C.

Q.—Is any other N. F. fluidextract made by this process?
A.—No.

Q.—How may the fixed oil be removed from **Fluidextractum Apii Fructus?**
A.—After allowing the fluidextract to stand, filter through paper wet with alcohol and reject the last few mils with the oil.

FLUIDGLYCERATA—FLUIDGLYCERATES

Q.—What are Fluidglycerates?
A.—Extractive preparations made from vegetable drugs made with 50% of glycerin and chloroform water, representing in each mil the activity of 1 Gm. of the drug.

Q.—What are their advantages over Fluidextracts?
A.—Being extracted with glycerin instead of alcohol they are more economical, not only because of the much lower cost of the glycerin, but there is no loss in evaporation. They mix clear with aqueous liquids.

Q.—What is the general process?
A.—1 part of glycerin and 3 parts of distilled water are mixed, the drug is thoroughly moistened with this, then packed very lightly in a cylindrical percolator. Sufficient menstruum is then poured on to saturate the powder and leave a stratum above. It is now allowed to macerate for 48 hours. The percolation is then allowed to go on slowly until the drug is exhausted, using first the mixture of glycerin and water in the proportion of 1 part glycerin and 3 parts water, until twice as much menstruum as drug has been used, then finish with chloroform water. The first 50% is set aside as reserve. The weak percolate is concentrated on the water-bath to 60%, the weakest portion first. Then the reserve is mixed and the evaporation continued until it

measures 100%. Allow to stand for a few days, then decant the clear portion and strain the remainder.

Q.—Is this process ever modified?
A.—It may be necessary to add an acid or an alkali to the menstruum in some instances.

Q.—How many Fluidglycerates are official?
A.—Five.

Q.—Name them.
A.—Fluidglycerate Cascara Sagrada, Cascara Sagrada Aromatic, Glycyrrhiza, Krameria, Rhubarb.

Q.—What agent is used to deprive the bark of its bitter principle in making Fluidglycerate of Cascara Sagrada Aromatic?
A.—Calcium Oxide, which is converted into Calcium Hydroxide.

Q.—How much bark is used in making 1000 mils of this Fluidglycerate?
A.—750 Gm.

Q.—What is used to make it up to 1000 mils?
A.—250 mils **Fluidglycerate of Glycyrrhiza.**

Q.—What addition is made to the menstruum in making Fluidglycerate of Glycyrrhiza?
A.—6% of Ammonia water is used.

Q.—Who is largely responsible for the introduction of the Fluidglycerates?
A.—Mr. George M. Beringer, of Camden, N. J.

EXTRACTA—EXTRACTS

Q.—Define Extracts.
A.—They are solid, semi-solid or powdered products prepared by exhausting drugs with appropriate solvents and carefully evaporating the solutions to the proper consistence.

Q.—What liquids are used in the extractions?
A.—Water, alcohol, or mixtures of these and in some cases an alkali or an acid is added.

Q.—What does the U. S. P. direct regarding the finishing of the Extracts?
A.—That they be concentrated without delay and avoid undue exposure to heat.

Q.—Why should the residue be frequently stirred during the evaporation?

A.—It hastens the evaporation and secures a more uniform product.

Q.—How should the pilular extracts be stored?

A.—Protected from the sunlight and air in tightly covered glass or earthen-ware containers.

Q.—How do powdered extracts differ from pilular extracts?

A.—They are dry and in a fine powder.

Q.—What advantages do they have over the pilular?

A.—They can be more accurately weighed and more conveniently preserved in tightly stoppered bottles.

Q.—What troublesome inert principle is extracted in preparing some of the powdered extracts?

A.—A fat or fixed oil.

Q.—Why is it troublesome?

A.—It prevents the reduction of the extract to a powder.

Q.—How is it removed?

A.—By exhausting or shaking out with purified petroleum benzin.

Q.—What is the limit of the temperature at which the extracts may be evaporated?

A.—Generally not to exceed 70° C.

Q.—How may the drying of the powdered extracts be facilitated?

A.—By spreading them on glass plates or tinned metal and exposing them to currents of warm dry air.

Q.—How are the powdered extracts to be stored?

A.—In small, tightly-stoppered, wide-mouthed bottles in a cool, dry place.

Q.—What diluents are used with the powdered extracts?

A.—Starch, dried at 100° C. and magnesium oxide are recommended in most of the formulas, but permission is given for the use of sugar, sugar of milk, powdered glycyrrhiza, magnesium carbonate, or the finely powdered drug or marc from which the respective extract was made.

Q.—What diluent is directed for the pilular extracts?

A.—Glucose.

Q.—What is the general drug strength of the extracts?
A.—Generally they represent 4 times their weight of drug.

Q.—How many U. S. P. extracts are official?
A.—27.

Q.—Name three U. S. P. which are official in more than one form?
A.—Belladonnæ Foliorum, pilular and powdered; Stramonii, pilular and powdered; Glycyrrhizæ Purum and Glycyrrhizæ.

Q.—Name those chemically assayed.
A.—Extractum Aconiti, Belladonnæ Foliorum, Colchici Cormi, Hydrastis, Hyoscyami, Nucis Vomicæ, Opii, Physostigmatis, Stramonii.

Q.—Name those which are biologically assayed.
A.—Extractum Cannabis and Aconiti.

Q.—Which is the strongest of the Extracts?
A.—Extractum Physostigmatis which represents 13 times its weight of drug.

Q.—What do you understand by a standardized extract as compared with an assayed extract?
A.—A standardized extract is one for which no satisfactory assay process has been devised and which is made to represent a definite weight of drug.

Q.—Name those extracts in which purified petroleum benzin is employed.
A.—Extractum Aconiti, Colchici Cormi, Ergotæ, Nucis Vomicæ, Physostigmatis.

Q.—Name those extracted with water alone.
A.—Cascara Sagrada, Gentianæ, Glycyrrhizæ Purum, Malti, Opii.

Q.—Which of the U. S. P. extracts are in accord with the International Protocol?
A.—Nucis Vomicæ and Opii.

Q.—What is the official Latin title for the one compound extract?
A.—Extractum Colocynthidis Compositum.

Q.—What does it contain?
A.—Aloes 50%, ext. colocynth 16%, soap 15%, resin of scammony 15%, cardamom seed 5%.

Q.—Which are the weakest of the extracts?
A.—**Extractum Rhei** which represents 2 times its weight of drug and **Extractum Opii.**

Q.—What acid is used in making **Ext. Aconiti?**
A.—Tartaric acid.

Q.—What is the rubric for this Extract?
A.—Not less than 1.8% nor more than 2.2% ether-soluble alkaloids. Biologically M. L. D. must not exceed 0.00001 Gm. per Gm. body-weight of guinea-pig.

Q.—What is the dose?
A.—0.010 Gm.

Q.—What other two extracts are made with tartaric acid as an ingredient in the menstrua?
A.—**Extractum Hydrastis** and **Physostigmatis.**

Q.—What other extract has an acid in the menstruum?
A.—**Extractum Ergotæ.**

Q.—What is the acid used here?
A.—Hydrochloric acid.

Q.—Of what particular use is it?
A.—It serves to make the alkaloids more soluble by converting them into hydrochlorides.

Q.—Is **Extract of Gentian** made with hot or cold water?
A.—With cold water.

Q.—Why is it not extracted with hot water?
A.—Because hot water would extract large quantities of pectin which have no medicinal value.

Q.—Why does the U. S. P. direct that the liquid extract be boiled and strained?
A.—To coagulate and remove albuminous matter.

Q.—What percentage of water-insoluble matter is permitted in **Extractum Glycyrrhizæ?**
A.—As much as 40%.

Q.—What is the principal constituent in **Ext. Malt?**
A.—Diastase.

Q.—To what class of substances does Diastase belong?
A.—To the ferments or enzymes.

Q.—Why must Ext. Malt be evaporated at 60° C. instead of 70° C.?

A.—Because the ferment Diastase is likely to be destroyed by a higher temperature.

Q.—To what degree of concentration must it be brought?

A.—To a specific gravity of 1.35 to 1.40 at 25° C.

Q.—Why is purified petroleum benzin used in making Extract of Nux Vomica?

A.—To remove a fixed oil which interferes with the powdering of the extract.

Q.—Why does the U. S. P. direct that this benzin residue be then treated with water and dilute sulphuric acid?

A.—The nux vomica alkaloids are slightly soluble in benzin and some might be removed by this benzin treatment for the removal of the oil. Hence they are converted into sulphates and dissolved out by the water. This aqueous solution is then made alkaline with ammonia water and shaken out with chloroform, the chloroformic solution being added to the extract so none of the alkaloids are lost.

Q.—What is the rubric for **Ext. Belladonnæ Foliorum?**

A.—Not less than 1.18% or more than 1.32% alkaloids.

Q.—What is the rubric for **Ext. Colchici Cormi?**

A.—Not less than 1.25% or more than 1.55% colchicine.

Q.—What is the rubric for **Ext. Hydrastis?**

A.—Not less than 9% or more than 11% of ether-soluble alkaloids.

Q.—What is the common name for **Ext. Hyoscyami?**

A.—Extract of Henbane.

Q.—What are the U. S. P. requirements for it?

A.—It must yield not less than 0.22% or more than 0.28% of alkaloids of hyoscyamus.

Q.—What is the dose?

A.—0.06 gm., or 1 gr.

Q.—What is the rubric for **Ext. Nux Vomica?**

A.—Not less than 15.2%, or more than 16.8% alkaloids.

Q.—What is the rubric for **Ext. Opii?**

A.—Not less than 19.5% or more than 20.5% anhydrous morphine.

Q.—What is the rubric for **Ext. Physostigmatis?**
A.—Not less than 1.7% or more than 2.3% alkaloids.

Q.—What is the rubric for **Ext. Stramonii?**
A.—Not less than 0.9% or more than 1.1% alkaloids.

Q.—What is the biological standard for **Ext. Cannabis?**
A.—Not more than 0.004 Gm. should be required for each Kg. body weight of dog to produce incoordination.

N. F. EXTRACTS

Q.—How many N. F. Extracts are official?
A.—13.

Q.—How many are chemically assayed?
A.—Three.

Q.—Name them.
A.—Extractum Cinchonæ, Conii, Ignatiæ.

Q.—What is the rubric for **Ext. Cinchonæ?**
A.—Not less than 22% or more than 26% of combined alkaloids of cinchona.

Q.—What acid is used in the preparation of **Ext. Conii?**
A.—Diluted Hydrochloric Acid.

Q.—What is the rubric for **Ext. Conium?**
A.—Not less than 1.8% or more than 2.2% coniine.

Q.—How is the diluted hydrochloric acid used in the preparation of this extract?
A.—The 90% of percolate is set aside as reserve. The acid is added to the weak percolate and then the mixture is reduced to 10% on the water-bath at a temperature not exceeding 50° C. Then this 10% is mixed with the 90% reserve and this evaporated at a temperature not above 50° C.

Q.—What is the rubric for **Ext. Ignatiæ?**
A.—Not less than 5.4% or more than 6.6% alkaloids.

Q.—How many N. F. Extracts are standardized on the drug?
A.—Five, Aloes, Euonymi, Krameriæ, Leptandræ and Quassiæ.

Q.—Which of these is the strongest?
A.—**Ext. Quassiæ** represents 10 of the drug.

Q.—Which is the weakest?
A.—Aloes; represents two of the drug.

Q.—Which of the N. F. Extracts is P. I?
A.—**Extractum Ergotæ Aquosum.**

Q.—What is the Protocol title for the preparation?
A.—Ergotin.

Q.—What are the synonyms for **Extractum Ferri Pomatum?**
A.—Ferri Malas Crudus, crude malate of iron.

Q.—From what is it prepared?
A.—Reduced iron and fresh apple juice.

Q.—How does it come to have the name "malate"?
A.—From malic acid which is a constituent of apple juice.

Q.—What temperature is permitted in the evaporation of Ignatia percolate for the extract?
A.—100° C.

Q.—What precaution is directed in the preparation of **Ext. Hæmotoxylon?**
A.—Avoid the use of metallic vessels.

Q.—What other name is sometimes applied to this extract?
A.—Extract of logwood.

Q.—Which is the one dry hard extract?
A.—Extractum Hæmatoxylon.

OLEORESINÆ—OLEORESINS

Q.—What are Oleoresins?
A.—Liquid preparations made by extracting oleoresinous drugs with ether.

Q.—How many are official?
A.—Six in U. S. P. and one in N. F.

Q.—Are they all extracted with ether?
A.—No, one is extracted with alcohol.

Q.—Were these made with Ether in the U. S. P. VIII?
A.—No, acetone was used.

Q.—What menstruum was used in the U. S. P. VII?
A.—Ether.

Q.—Why was the change made to Acetone in U. S. P. VIII?

A.—Because Acetone extracted the virtues of the drug quite as well and was much cheaper.

Q.—What was the reason for the considerable difference in cost of the two solvents?

A.—Acetone is obtained from products yielded by the destructive distillation of wood, while ether is made from alcohol, on which a tax of $1.10 for each proof gallon was collected.

Q.—Why is it that there is now a return to Ether?

A.—Because since 1906 denatured alcohol on which no such tax is collected has been available for the manufacture of ether, so it may now be made at a less cost than acetone.

Q.—What can be said of the strength of the Oleoresins?

A.—The strengths vary but are the strongest of the liquid preparations, representing from 5 to 10 times the strength of the drug.

Q.—How is the extraction made?

A.—By percolation. Then recovery of most of the solvent by distillation.

Q.—What particular care must be taken?

A.—Because of the nature of the menstruum care must be taken to prevent evaporation of the ether and in the concentration of the percolate care must be taken to prevent the ether taking fire.

Q.—Is the drug first moistened before packing?

A.—No.

Q.—How should it be packed?

A.—Firmly.

Q.—In what other way might the drug be extracted?

A.—By the use of a Soxhlet extractor, with which a much less quantity of ether would be required.

Q.—Name the official Oleoresins.

A.—Oleoresina Aspidii.
Capsici.
Cubebæ.
Petroselini.
Piperis.
Zingiberis.
} These six U. S. P.

Lupulini, N. F.

Q.—What is another name for Aspidium?
A.—Male fern.

Q.—What does the U. S. P. require regarding the drug?
A.—It must be freshly ground.

Q.—What is it therapeutically?
A.—Tænicide.

Q.—What is the dose?
A.—2 Gm.

Q.—What does the U. S. P. direct regarding the dose?
A.—The above quantity to be given once a day.

Q.—What happens to this preparation when it stands?
A.—It deposits a white granular precipitate.

Q.—What is this?
A.—Filicic acid.

Q.—Is it an active substance?
A.—Yes, the preparation depends upon this for its activity.

Q.—What should be done before it is dispensed?
A.—It should be thoroughly shaken.

Q.—How is it dispensed?
A.—Usually in capsules but may be given in emulsion.

Q.—How is it most effectively administered?
A.—Nothing should be eaten for twelve hours and the bowels should be evacuated. Give the 2 Gm., then follow in about 4 hours by a saline purge.

Q.—May castor oil be given in place of the saline?
A.—It is not advisable for the oil acts dissolvingly on the filicic acid which may then be absorbed in toxic quantities.

Q.—What is the yield of **Oleoresin Aspidium?**
A.—About 15%.

Q.—What deposit is found in **Oleoresin Capsicum?**
A.—A granular fat.

Q.—Is this of value?
A.—No, it is rejected at the time the preparation is made.

Q.—What is it therapeutically?
A.—Externally rubifacient, internally carminative.

Q.—What is the dose?
A.—0.03 Gm.

Q.—Into what official preparation does it enter?
A.—Emplastrum Capsici.

Q.—What menstruum is used in making **Oleoresin Cubeb?**
A.—Alcohol.

Q.—What happens to this preparation on standing?
A.—It deposits a waxy, crystalline precipitate.

Q.—Is it of value?
A.—No, it must be rejected at the time of dispensing.

Q.—What is it therapeutically?
A.—Diuretic; stimulant to mucous membrane.

Q.—What is the dose?
A.—0.5 Gm.

Q.—What is the yield of Oleoresin?
A.—22%.

Q.—Into what official preparation does it enter?
A.—Trochisi Cubebæ.

Q.—What is the synonym for **Oleoresin of Parsley Fruit?**
A.—Liquid Apiol.

Q.—What does the U. S. P. direct in finishing this?
A.—Let it stand 4 or 5 days without agitation, then decant the liquid from any solid portion.

Q.—What is it therapeutically?
A.—Emmenagogue.

Q.—What is the dose?
A.—0.5 mil.

Q.—What restrictions are placed on its sale in some states?
A.—Because of its use as an abortifacient it may only be dispensed on a physician's prescription.

Q.—What deposit separates from **Oleoresin Pepper?**
A.—Piperine.

Q.—Is this to be dispensed?
A.—No, it is separated and rejected at the time the preparation is finished.

Q.—By what commercial name is this preparation known?
A.—Oil of pepper.

Q.—What is it therapeutically?
A.—Carminative; gastric stimulant.

Q.—What is the yield of the oleoresin?
A.—6.5%.

Q.—What is the yield of **Oleoresina Zingiberis?**
A.—6%.

Q.—What is it therapeutically?
A.—Carminative.

Q.—What is the dose?
A.—0.03 Gm.

Q.—What oleoresin is official in the N. F.?
A.—**Oleoresina Lupulini.**

Q.—What is the yield?
A.—60%.

Q.—What care is to be used in packing this?
A.—Because of the large content of resin it must be packed very lightly.

Q.—What is it therapeutically?
A.—Diuretic; tonic; anodyne.

Q.—What is the dose?
A.—0.2 mil.

Q.—Are these preparations usually found at the prescription counter?
A.—No.

Q.—How are they most readily prepared in small quantities?
A.—Draw out a test tube in the form of a small percolator or use the barrel of a glass syringe.

PULVERES—POWDERS

Q.—What is the Latin title for powders?
A.—Pulvis, (pl.) Pulveres.

Q.—Define Powders.
A.—Intimate mixtures of impalpable solid substances.

Q.—How many are official?
A.—Seven in the U. S. P. and 14 in N. F.

Q.—Give some reasons for medicinal substances being prescribed in powder form.
A.—Some substances have a different therapeutic effect in powder form than in solution or pill; some doses are too bulky to be administered in any other form; powders are most easily administered to small children; as there is no moisture present there is less likelihood of incompatibility; those substances whose medicinal value is mechanical are best administered dry in powder form.

Q.—Give an example of a substance which acts differently in powder form than in solution.
A.—A teaspoonful of common salt placed on the tongue and swallowed will often stop hemorrhage, but if it is mixed with a teacupful of warm water it acts as a prompt emetic. The bromides if taken in powder form are quite likely to act as an irritant to the stomach but taken in solution they are sedative.

Q.—What two conditions must characterize all powders?
A.—They must be impalpable and intimately mixed.

Q.—What is the meaning of the word impalpable?
A.—So fine that the separate particles are not perceptible to the touch.

Q.—What is meant when a powder is ordered to be administered by "insufflation"?
A.—To be blown through a quill or tube into the eye, ear, nose or throat.

Q.—Name four dosage forms of powders.
A.—Chartulæ, cachets, capsules, tablet triturates.

Q.—What is the meaning of the word "chartula"?
A.—A little paper.

Q.—By what other names is "cachet" known?
A.—Starch capsules, konseals, wafers.

Q.—What precautions must be observed in dispensing powders?
A.—They should be folded so as to nicely fit the box in which they are dispensed. The powder must be so placed in the paper that it will not sift out at the ends.

Q.—What must be done with a deliquescent powder?
A.—It must be folded in waxed paper.

Q.—What other powders call for the same treatment?
A.—Odorous or volatile substances.

Q.—What untoward effect may trituration have on a powder?
A.—It may destroy the property of diffusibility which a substance possesses.

Q.—Give an example of a substance which is likely to be affected in this manner.
A.—Magnesium oxide.

Q.—How should such substances be mixed in powders?
A.—By running repeatedly through a fine sieve or with a horn spatula on paper.

Q.—What substance is rendered diffusible by trituration?
A.—Sulphur.

Q.—What further effect may long trituration have on powders?
A.—It may change the therapeutic action of the ingredients.

Q.—Name an official powder so affected.
A.—Pulvis Ipecacuanhæ et Opii.

Q.—Why are powders prescribed in capsules or cachets?
A.—To mask disagreeable taste.

Q.—How are cachets administered?
A.—They are dropped into a little water until they soften, then swallowed.

Q.—How are powders administered?
A.—If the dose is rather small the dry powder is placed on the tongue and swallowed with a draught of water. If the dose is rather large the powder may be stirred up in water and drunk.

Q.—When powders in papers are prescribed, is it permissible to rub the powders down flat after they have been folded?
A.—No, this is likely to render the powder nondiffusible.

Q.—Would you dispense two or three powders in a box?
A.—No, use a small drug envelope.

Q.—Are powders ever dispensed in bulk?
A.—Yes, occasionally when they are prescribed in teaspoonful doses.

Q.—How are they dispensed then?

A.—If the powder is deliquescent or volatile it is placed in a wide-mouthed bottle with a tightly fitting stopper. If not, it may be dispensed in an ordinary box, care being taken to see that the box is of such size that the powder quite well fills it.

Q.—How should powders be divided into doses?

A.—If there is no really potent substance, the bulk may be formed into a rectangle on the pill tile one edge close to the division scale on the tile, then with the spatula cut into the required number of doses.

Q.—Can accuracy be had in this manner?

A.—No, the only accurate method is by weighing each powder, which with a little practice can be rapidly done.

Q.—When small quantities of potent substances are prescribed in powders, what precaution must be taken to correctly dispense same?

A.—A quantity of the diluent equal to the potent drug is first placed in the mortar and triturated thoroughly with the active drug, then double the quantity of the diluent may follow and this must be again actively mixed, then follow in the same manner until all the materials are incorporated.

Q.—Why is all the diluent not put in at once?

A.—Because no amount of trituration will under these circumstances bring about the same even and thorough distribution.

Q.—What further precaution is to be observed in mixing powders?

A.—Not to triturate them with too much force, as many substances are electrified in this manner and it causes them to adhere to spatulas and paper, thus making it difficult to evenly divide them.

Q.—Name the official powders of the U. S. P.

A.—Pulvis Aromaticus, Cretæ Compositus, Effervescens Compositus, Glycyrrhizæ Compositus, Ipecacuanhæ et Opii, Jalapæ Compositus, Rhei Compositus.

Q.—What is there in **Pulvis Aromaticus?**

A.—35% each of Saigon cinnamon and Jamaica ginger, 15% each cardamom seed and myristica.

Q.—What is specifically mentioned regarding the cardamom seed?
A.—They must be deprived of the pericarps.

Q.—Why must they be removed?
A.—They are inert and it is almost impossible to reduce them to a fine powder.

Q.—What is the dose?
A.—1 Gm.

Q.—What is the powder generally used for?
A.—To mask the taste of disagreeable powders.

Q.—What official preparation is made from this powder?
A.—Fluidextractum Aromaticum.

Q.—What is there in **Pulvis Cretæ Compositus?**
A.—30% prepared chalk, 20% acacia, 50% sugar.

Q.—What particular use is made of this powder?
A.—It is used in making the official Mistura Cretæ.

Q.—Is Mistura Cretæ usually kept in stock?
A.—No.

Q.—Why is it not kept in stock?
A.—Because it so quickly ferments.

Q.—What causes the fermentation?
A.—The rather dilute solution of sugar and acacia.

Q.—Why are acacia and sugar present?
A.—To suspend the prepared chalk.

Q.—What is prepared chalk chemically?
A.—Calcium carbonate.

Q.—Is it soluble or insoluble?
A.—Insoluble, but in a very finely divided state so it can be fairly easily suspended.

Q.—What is the Mistura used for?
A.—In cases of diarrhea, especially that form caused by fermentation of food.

Q.—How is it of service in this trouble?
A.—It coats the irritated mucous membrane with an insoluble coating and prevents further irritation.

Q.—Why is Prepared Chalk used instead of Precipitated?

A.—The Prepared is amorphous, hence very smooth, the Precipitated is crystalline and would likely act as an irritant.

Q.—How is Prepared Chalk prepared?

A.—By elutriation.

Q.—What is the common name for **Pulvis Effervescens Compositus**?

A.—Seidlitz powder.

Q.—How is it put up for dispensing?

A.—One portion in a blue paper and one portion in a white paper.

Q.—What is there in the blue paper?

A.—2.5 Gm. sodium bicarbonate and 7.5 Gm. potassium and sodium tartrate.

Q.—What is there in the white paper?

A.—2.16 Gm. tartaric acid.

Q.—According to the U. S. P. how much must the contents of the blue paper weigh?

A.—Not less than 9.5 or more than 10.5 Gm.

Q.—What is the required percentage of each of the salts in the blue paper?

A.—Not less than 23% or more than 27% of sodium bicarbonate and not less than 73% or more than 78% of potassium and sodium tartrate.

Q.—What is the common name for the mixture of sodium bicarbonate and potassium and sodium tartrate?

A.—Seidlitz mixture.

Q.—Why are the powders put up in separate papers?

A.—So they will not absorb moisture and cause the reaction of effervescence to go on in the paper.

Q.—What further precaution is sometimes taken?

A.—The tartaric acid is wrapped in waxed paper.

Q.—How does the U. S. P. direct that they be stored?

A.—In a well-closed container, in a dry place.

Q.—What is a dose of this powder?

A.—One white and one blue powder.

Q.—How are they administered?

A.—Dissolve the contents of one paper in part of a glass of water and the contents of the other paper in another small portion of water, then pour the two solutions together and administer while the effervescence is going on.

Q.—Would it do for the person to take first one solution and then the other?

A.—No, the gas generated might strangle the patient or rupture the stomach.

Q.—What is the therapeutic action?

A.—Laxative.

Q.—What two assay processes are given in connection with this powder?

A.—One for the sodium bicarbonate and one for the potassium and sodium tartrate.

Q.—What is the synonym for **Pulvis Glycyrrhizæ Comp?**

A.—Compound licorice powder.

Q.—What does it contain?

A.—Senna 18%, glycyrrhiza 23.6%, washed sulphur 8%, oil fennel 0.4%, sugar 50%.

Q.—Why is the oil of fennel used and not the seed?

A.—It is difficult to reduce the seed to a fine powder and the seed soon acquires a rancid, musty odor.

Q.—How fine must the powder be?

A.—It must pass through a No. 80 sieve.

Q.—What acid gas must the powder be free of?

A.—Hydrogen sulphide H_2S.

Q.—What test proves the presence of senna in this powder?

A.—Moisten with alcohol, then boil with water and filter. This gives a yellowish color and the addition of a drop of potassium hydroxide T. S. gives a deep reddish-brown.

Q.—What causes this color?

A.—The emodin in the senna.

Q.—What other microscopical test is given under this powder?

A.—One for the presence of glycyrrhiza.

Q.—What is the synonym for **Pulvis Ipecacuanhæ et Opii?**

A.—Dover's powder.

Q.—What does it contain?
A.—10% each, powdered opium and ipecac with 80% sugar of milk.

Q.—What powder number is the sugar of milk?
A.—Number 30.

Q.—What is the fineness of the finished powder?
A.—Number 80.

Q.—Why, then, is the sugar of milk ordered in a 30 powder and reduced to an 80 powder by trituration?
A.—In reducing the sugar of milk to an 80 powder, the other ingredients are made into a very fine powder which has the effect of making them more active.

Q.—What is the powder therapeutically?
A.—Diaphoretic.

Q.—What does diaphoretic mean?
A.—Increases the excretion of perspiration.

Q.—What is the therapeutic property of opium?
A.—Anodyne and hypnotic.

Q.—What is the therapeutic property of ipecac?
A.—Expectorant and emetic.

Q.—What is the dose of the powder?
A.—0.5 Gm.

Q.—What tests are given for the recognition of the ingredients of this powder?
A.—Microscopic test for the presence of sugar of milk also its slow solubility in water and chloral hydrate, polarization of light with play of colors. Ipecac recognized by starch grains and confirmed by iodine T. S. Stone cells of poppy capsules is a test for the presence of opium.

Q.—What is the synonym for **Pulv. Jalapæ Compositus?**
A.—Pulvis Purgans.

Q.—What is there in the powder?
A.—Jalap 35%, Potassium Bitartrate 65%.

Q.—What is the common name for Potassium Bitartrate?
A.—Cream of tartar.

Q.—What tests are used to identify ingredients?
A.—Microscope shows characteristic shape of crystals of potassium bitartrate, also slow solubility in water and chloral hydrate T. S., Strong polarization of light and play of colors. Starch, calcium oxalate also characteristic cells of jalap.

Q.—What is the powder therapeutically?
A.—Purgative.

Q.—What is the dose?
A.—2 Gm.

Q.—What is the synonym for **Pulv. Rhei Compositus?**
A.—Gregory's powder.

Q.—What does it contain?
A.—Rhubarb 25%, Jamaica ginger 10%, magnesium oxide 65%.

Q.—How should it be put together?
A.—The two vegetable powders should be thoroughly mixed then the magnesia added and thoroughly incorporated without hard trituration. Finally it is to be passed through a No. 60 sieve.

Q.—What is the reason for these directions?
A.—Magnesia is naturally quite readily diffusible, but trituration deprives it of this valuable property.

Q.—What is the color of the powder?
A.—Pinkish, growing darker as it stands.

Q.—What causes this color?
A.—Moisture in the atmosphere reacts with the MgO to form magnesium hydroxide which is alkaline and this in turn reacts with the resins of the rhubarb to give the pinkish to red coloration.

Q.—What is the powder therapeutically?
A.—Antacid and stomachic.

Q.—What is the dose?
A.—2 Gm.

N. F. POWDERS

Q.—Name those official in the N. F.
A.—Pulvis Acetanilidi Compositus.
Aloes et Canellæ.
Antimonialis.
Antisepticus.

Aromaticus Rubefaciens.
Cretæ Aromaticus.
Cretæ et Opii Aromaticus.
Gambir Compositus
Hydrargyri Chloridi Mitis et Jalapæ.
Kino et Opii Compositus.
Myrciæ Compositus.
Pancreatini Compositus.
Rhei et Magnesiæ Anisatus.
Talci Compositus.

Q.—What is there in **Pul. Acetanilidi Compositus?**
A.—Acetanilid 70%, Caffeine 10%, Sodium bicarbonate 20%.

Q.—What is it therapeutically?
A.—Analgesic and febrifuge.

Q.—What is it generally used for?
A.—To relieve headache.

Q.—How does it act to relieve headache?
A.—Depresses the circulation.

Q.—Which of the ingredients is the depressant?
A.—Acetanilid.

Q.—What is the Caffeine?
A.—An alkaloid obtained from tea and coffee.

Q.—What is it therapeutically?
A.—Stimulant.

Q.—What is it in this powder for?
A.—To protect the heart from the too depressant action of the acetanilid.

Q.—What is the Sodium bicarbonate for?
A.—Originally because it was said to render the acetanilid more soluble, but this was proved to be an error. It is now said to be there for its antacid properties.

Q.—Might this powder be said to be poisonous?
A.—Yes.

Q.—What are the first poison symptoms?
A.—Cyanosis. Blue color seen on the lips and the white portion of the finger nails.

Q.—How should it be treated?

A.—Remove the powder from the stomach. Give stimulants, plenty of fresh air, keep body warm. If necessary use artificial respiration.

Q.—What is the dose?

A.—0.3 Gm.

Q.—What people should be cautioned regarding its use?

A.—Those known to have heart trouble.

Q.—What "trade" preparation is like this?

A.—Antikamnia.

Q.—What is the synonym for **Pulv. Aloes et Canellæ?**

A.—Hiera Picra.

Q.—What does it contain?

A.—Aloes 80%, Canella 20%.

Q.—What is the common name for Canella?

A.—White cinnamon bark.

Q.—What is the powder therapeutically?

A.—Laxative and emmenagogue.

Q.—What is the dose?

A.—0.3 Gm.

Q.—What is the synonym for **Pulv. Antimonialis?**

A.—James' powder.

Q.—What does it contain?

A.—Antimony oxide 33%, Precipitated Calcium Phosphate 67%.

Q.—What is the dose?

A.—0.2 Gm.

Q.—What is the English title for **Pulv. Antisepticus?**

A.—Soluble antiseptic powder.

Q.—What does it contain?

A.—Salicylic acid 0.5%, phenol, eucalyptol, menthol and thymol each 0.1%, zinc sulphate 12.5%, boric acid 86.6%.

Q.—How is it put together?

A.—Triturate the salicylic acid and the zinc sulphate to a fine powder, then add the phenol, eucalyptol, menthol and thy-

mol, previously liquefied by trituration, continue the trituration adding the boric acid in small portions. Finally pass through an 80 sieve.

Q.—What is there in **Pulv. Aromaticus Rubefaciens?**
A.—Clove and Saigon cinnamon each 30%, Jamaica ginger and capsicum each 20%.

Q.—How is this powder to be stored?
A.—In a tightly closed container.

Q.—What is this particularly used for?
A.—To make the Spice Poultice.

Q.—How is it prepared?
A.—Place the powder in a flat muslin bag and moisten with warm diluted alcohol or vinegar.

Q.—What is there in **Pulv. Cretæ Aromaticus?**
A.—Saigon cinnamon 8%, myristica 6%, clove 3%, cardamom seed 2%, prepared chalk 25% and sugar 56%.

Q.—How is it to be stored?
A.—In a well-stoppered bottle.

Q.—What is the dose?
A.—2 Gm.

Q.—What is there in **Pulv. Cretæ et Opii Aromaticus?**
A.—Powdered opium 2.5%, aromatic chalk powder 97.5%.

Q.—What is the dose?
A.—1 Gm.

Q.—What N. F. III powder does **Pulv. Gambir Compositus** replace?
A.—Pulvis Catechu Compositus.

Q.—What does the official powder contain?
A.—Gambir 40%, kino and krameria each 20%, Saigon cinnamon and myristica each 10%.

Q.—What is the dose?
A.—1.3 Gm.

Q.—What is the synonym for **Pulv. Hydrargyri Chloridi Mitis et Jalapæ?**
A.—Calomel and jalap.

Q.—What does it contain?
A.—Calomel 34%, jalap 66%.

Q.—What is the dose?
A.—0.65 Gm.

Q.—What is there in **Pulv. Kino et Opii Compositus?**
A.—Kino 75% Saigon cinnamon 20%, powdered opium 5%.

Q.—How are the ingredients put together?
A.—Mix the powders intimately, pass the mixture through a moderately fine sieve and afterwards rub lightly in a mortar. Keep in a stoppered bottle.

Q.—What is the dose?
A.—1 Gm.

Q.—What is the synonym for **Pulv. Myricæ Compositus?**
A.—Composition powder.

Q.—What does it contain?
A.—Bayberry bark 60%, Jamaica ginger 30%, capsicum and clove each 5%.

Q.—What is the dose?
A.—1 Gm.

Q.—What is the synonym for **Pulv. Pancreatini Compositus?**
A.—Peptonizing powder.

Q.—What does it contain?
A.—Pancreatin 20%, sodium bicarbonate 80%.

Q.—What is the powder used for?
A.—To peptonize milk.

Q.—What is meant by the word "peptonize"?
A.—To convert into peptones, that is, predigest or partially digest.

Q.—How does the sodium bicarbonate act in this powder?
A.—It only serves to make the liquid alkaline, this promotes the action of the pancreatin. An acid medium would destroy the pancreatin or prevent its acting on the milk.

Q.—How much of the powder should be used?
A.—1.5 Gm. is sufficient to peptonize 500 mils of fresh milk.

Q.—How is it used?
A.—Dissolve the powder in 125 mils of tepid water, then add milk and maintain the mixture at a temperature of 38°C., for 30

minutes, the milk having been first brought to this same temperature.

Q.—How should the milk thus prepared be stored?
A.—In a cool place, preferably a refrigerator.

Q.—How long may this milk be kept for use?
A.—Not longer than 24 hours, nor after it has developed a bitter taste.

Q.—What is the synonym for **Pulv. Rhei et Magnesiæ Anisatus**?
A.—Compound Anise Powder.

Q.—What does it contain?
A.—Rhubarb 35%, heavy magnesium oxide 65%, anethol 0.8%, alcohol 1%.

Q.—What is anethol?
A.—A principle obtained from oil of anise.

Q.—What is the dose of the powder?
A.—For infants 0.3 Gm.

Q.—How should the powder be stored?
A.—In well-stoppered bottles.

Q.—What is the synonym for **Pulv. Talci Compositus**?
A.—Boro-Salicylated Powder of Talc.

Q.—What does it contain?
A.—Salicylic acid 3%, boric acid 10%, talc 87%.

GRANULAR EFFERVESCENT SALTS

Q.—Give the English name for Salia Effervescentia.
A.—Granular Effervescent Salts.

Q.—Is such a class of preparations official?
A.—Yes the class is official in the N. F., and the U. S. P. gives directions for the preparation of three such salts but does not list them as a class.

Q.—What three are so prepared in the U. S. P.?
A.—Caffeina Citrata Effervescens, Potassii Citras Effervescens, Sodii Phosphas Effervescens.

Q.—Define Salia Effervescentia.
A.—Granular preparations made by heating mixtures of medicinal substances with sodium bocarbonate, tartaric and citric acids, which effervesce when dissolved in water.

Q.—How are they prepared?

A.—The medicinal substance is powdered and mixed with the sodium bicarbonate, citric and tartaric acids all in fine powder. This mixture is heated to the temperature of boiling water until it forms a dough-like mass which is then rubbed through a No. 6 tinned-iron sieve to form the granules. These are then dried at a temperature not above 54°C.

Q.—Why are the acids and the bicarbonate used?

A.—When dissolved in water they react releasing carbon dioxide which makes the medicinal substance more palatable.

Q.—What is necessary to form the dough?

A.—A very small amount of moisture.

Q.—Can water, as such, be used?

A.—No.

Q.—Why can not water be used?

A.—It can not be so evenly and thoroughly distributed through the mixture as to form a dough and not cause the reaction to go on between the acids and the bicarbonate, thus making the salt noneffervescent when dissolved.

Q.—What furnishes the required amount of moisture?

A.—The citric acid.

Q.—What form of citric acid must be used?

A.—Uneffloresced crystals.

Q.—Why is citric acid selected for the purpose?

A.—Because it contains one molecule of water of crystallization, which proves to be, in the weights of acid directed, just the correct amount of water.

Q.—Why is not all the acid used in the mixture Citric acid?

A.—This would introduce too much moisture and the reaction would go to completion.

Q.—Why is not all Tartaric Acid used?

A.—It does not have any water of crystallization, hence would not form the necessary dough.

Q.—How does the U. S. P. direct that the heating be done?

A.—The mixed powders are placed on a glass plate or in a suitable dish, then heated in an oven at a temperature from 93° to 104°C.

Q.—Why must the mixture be manipulated with a wooden spatula?

A.—An iron spatula would discolor the salt.

Q.—How must the granular effervescent salts be stored?

A.—In tightly sealed containers.

Q.—What further precaution is directed by the U. S. P.?

A.—To prevent the product coming in contact with air containing moisture.

Q.—What method other than the above does the N. F. permit for making the mass and granules?

A.—When only a small quantity is to be made the powder may be heated in a double boiler, well covered, the dish being in direct contact with boiling water. The pasty mass is then stirred until dry.

Q.—In what condition must all the powders be which enter into these salts?

A.—They must all be in a fine powder and free from atmospheric dampness and all salts other than the citric acid must be deprived of water of crystallization.

Q.—What are the differences in temperatures directed in the U. S. P. and N. F. in the preparation of the effervescent salts?

A.—The U. S. P. heats from 93° to 104°C., the N. F. from 95° to 105°C. The U. S. P. dries the granules at not above 54°C., the N. F. at not above 50°C.

Q.—How much **Citrated Caffeine** is there in the U. S. P. effervescent salt?

A.—4%.

Q.—What is the dose of the preparation?

A.—4 Gm.

Q.—What assay process is official under this salt?

A.—One for Citrated Caffeine.

Q.—Upon what does this process depend?

A.—The isolation of Caffeine.

Q.—What proportion of Anhydrous Caffeine must the preparation contain?

A.—Not less than 1.9%.

Q.—In preparing **Potassii Citras Effervescens** what is the first thing to be done?
A.—Dry the potassium citrate until it ceases to lose weight.

Q.—How much Potassium Citrate is used?
A.—20%.

Q.—How much of the preparation is a dose?
A.—4 Gm.

Q.—What form of Sodium Phosphate is used in making **Sodii Phosphas Effervescens?**
A.—Exsiccated Sodium Phosphate.

Q.—How much is used?
A.—20%.

Q.—How much is a dose of the effervescent salt?
A.—10 Gm.

N. F. GRANULAR EFFERVESCENT SALTS

Q.—How many N. F. effervescent salts are official?
A.—Seven.

Q.—Name them.
A.—Sal Carolinum Factitium Effervescens.
Sal Kissingense Factitium Effervescens.
Sal Lithii Citratis Effervescens.
Sal Potassii Bromidi Effervescens.
Sal Potassii Bromidi Effervescens Compositus.
Sal Vichyanum Factitium Effervescens.
Sal Vichyanum Factitium Effervescens cum Lithio.

Q.—What is the meaning of the word "factitium"?
A.—Artificial.

Q.—What three artificial salts are used in the official effervescent salts?
A.—Sal Carolinum Factitium. Sal Kissingense Factitium. Sal Vichyanum Factitium.

Q.—What is the English name for **Sal Carolinum Factitium?**
A.—Artificial Carlsbad Salt.

Q.—What two forms of the salt are official?
A.—The dry, amorphous form and the crystalline form.

Q.—What does the salt contain?

A.—Potassium sulphate 2, sodium chloride 18, sodium bicarbonate 36, sodium sulphate 100.

Q.—How is the salt prepared?

A.—The sulphates and the chloride are mixed and dried to a constant weight, then the bicarbonate is added and thoroughly mixed.

Q.—What is the English title for **Sal Kissingense Fact?**

A.—Artificial Kissingen Salt.

Q.—What does this salt contain?

A.—Potassium chloride 17 Gm., sodium chloride 357 Gm., magnesium sulphate 120 Gm., sodium bicarbonate 107 Gm.

Q.—How is the magnesium sulphate treated?

A.—Dried to a constant weight at 110°C.

Q.—What is the English name for **Sal Vichyanum Factitium?**

A.—Artificial Vichy Salt.

Q.—What does it contain?

A.—84.6% sodium bicarbonate, 3.85% potassium carbonate, 8% magnesium sulphate, 7.7% sodium chloride.

Q.—How is the magnesium sulphate treated?

A.—Dried to a constant weight at 110°C.

Q.—In preparing the effervescent artificial Carlsbad salt, how much of the artificial salt is used?

A.—26.6%.

Q.—What is a dose of the effervescent salt?

A.—6 Gm. in 200 mils of water.

Q.—By what other name is this salt and water known?

A.—Sprudel salt, sprudel water.

Q.—How much Artificial Kissingen Salt is there in the effervescent preparation?

A.—40%.

Q.—How much of the effervescent salt is a dose?

A.—5.5 Gm. in 200 mils of water is similar to an equal volume of Kissingen water (Rakoczi Spring).

Q.—How much of the **Artificial Vichy Salt** is there in the effervescent preparation?

A.—25%.

Q.—How much of the effervescent preparation is a dose?
A.—4 Gm. 375 Gm. in 200 mils of water is equal to a similar volume of Vichy water (Grande Grille Spring).

Q.—How much **Lithium Citrate** in the effervescent salt?
A.—5%.

Q.—What is the dose of the effervescent salt?
A.—8 Gm.

Q.—How much **Potassium Bromide** in the effervescent preparation?
A.—16.6%.

Q.—What is the dose of the effervescent salt?
A.—6 Gm.

Q.—What additional salts are there in the **Compound Effervescent Salt of Potassium Bromide?**
A.—Caffeine 0.8% and Lithium Carbonate 4.2% and the Potassium Bromide is 8.3%.

Q.—What is the dose of this salt?
A.—6 Gm.

SPECIES

Q.—What are Species commonly called?
A.—Teas.

Q.—How are they administered?
A.—Usually by making an infusion.

Q.—Is there an exception to this?
A.—Sometimes they are not intended for internal use, then a poultice is made.

Q.—Are there any U. S. P. species?
A.—No.

Q.—How many are there in the N. F.?
A.—Three.

Q.—Name them.
A.—Species Emollientes; Laxativæ; Pectorales.

Q.—What is there in **Species Emollientes?**
A.—20% each althæa leaves, mallow leaves, melilot, matricaria and linseed.

Q.—How is it prepared?
A.—All the ingredients are reduced to a coarse powder then uniformly mixed.

Q.—How is the Emollient Poultice prepared from this?
A.—By the addition of a suitable quantity of hot water.

Q.—What is there in **Species Laxativæ?**
A.—Senna 40%, sambucus 25%; fennel 12.5%, anise 12.5%, potassium bitartrate 10%.

Q.—How is it prepared?
A.—Moisten the senna with a little water, then sprinkle the potassium bitartrate over it uniformly. When dry mix with the rest of the ingredients.

Q.—What is the synonym for this preparation?
A.—St. Germain Tea.

Q.—What is the dose?
A.—1.3 Gm.

Q.—What is the synonym for **Species Pectorales?**
A.—Breast tea; Species ad Infusion Pectorale.

Q.—What is there in the preparation?
A.—Althæa 40%, coltsfoot 20%, glycyrrhiza 15%, anise 10%, mullein flowers 10%, orris 5%.

Q.—What is the dose?
A.—4 Gm.

TRITURATIONS

Q.—What are Triturations?
A.—Impalpable mixtures of 10% of Medicinal Substance and 90% Sugar of Milk.

Q.—How is the mixture made?
A.—By diligent trituration.

Q.—What is their pharmaceutic advantage?
A.—It is the most convenient way of weighing small amounts of very potent solids.

Q.—What is their therapeutic advantage?
A.—They present large extent of surface for the action of the gastric juices so they may be quickly taken up.

Q.—Is the process official as well as the formula?
A.—Yes.

Q.—In which standard book?
A.—The U. S. P.

Q.—Are there any special Triturations official?
A.—Yes, one.

Q.—Name it.
A.—**Trituratio Elaterini.**

Q.—Are there any N. F. triturations official?
A.—No.

Q.—What is the reason for making Trit. Elaterini official?
A.—The drug is very potent and the substance from which it is obtained is of variable strength, hence it was made official as a trituration to, in a measure, standardize the drug.

Q.—What is Elaterin?
A.—It is a neutral principle obtained from Elaterium.

Q.—What is the common name for the plant from which it is obtained?
A.—Squirting cucumber. (Ecballium Elaterium.)

Q.—How much of this trituration is a dose?
A.—0.03 Gm.

Q.—What is it therapeutically?
A.—Hydrogogue cathartic.

Q.—In what particular conditions is it used?
A.—Dropsy.

Q.—How does the U. S. P. direct the making of Triturations?
A.—Weigh the drug and the sugar of milk separately. Triturate the drug to a fine powder if necessary. Add an equal measure of sugar of milk to the drug and mix well by means of a spatula, then triturate thoroughly. Add fresh portions of sugar of milk from time to time, until the whole is added and triturate well after each addition.

CONFECTIONS

Q.—Define Confections.
A.—Sweetened and flavored masses of medicinal substances intended for internal use.

Q.—By what other names are they known.
A.—Conserves and electuaries.

Q.—From what forms of drugs are they made?
A.—From the fresh fruit and from the powdered drug.

Q.—What is used to form the mass?
A.—Sugar, sometimes an addition of honey.

Q.—Are there any U. S. P. confections official?
A.—No.

Q.—How many are official in the N. F.?
A.—Two.

Q.—Name them.
A.—Confectio Rosæ; Sennæ.

Q.—What other name is applied to **Confectio Rosæ**?
A.—Conserve of Rose.

Q.—What other name is applied to **Confectio Sennæ**?
A.—Electuary of Senna.

Q.—What is there in Confectio Rosæ?
A.—Red rose 8%, sugar 64%, clarified honey 12%, stronger rose water 16%.

Q.—What is it therapeutically?
A.—Astringent.

Q.—What is its pharmaceutical use?
A.—Used as a pill excipient, official in two pills.

Q.—What is there in Confectio Sennæ?
A.—10% senna, 16% cassia fistula, 10% tamarind, 7% prune, 12% fig, 55.5% sugar, 0.5% oil coriander.

Q.—What is it therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—4 Gm.

TROCHISCI—TROCHES

Q.—Define Troches.
A.—Solid, flattened masses of medicinal substances cut into dosage forms and intended for internal use.

Q.—How many are official?
A.—Five U. S. P. and 9 N. F.

Q.—What is used to make the mass?
A.—Generally tragacanth and sugar.

Q.—Why is tragacanth generally used instead of acacia?
A.—Tragacanth makes a more tenacious mass.

Q.—How are troches intended to be administered?
A.—Placed on the tongue and allowed to slowly dissolve.

Q.—What is the average weight of a troche?
A.—0.65 Gm., 10 gr.

Q.—Name the U. S. P. troches.
A.—Trochisci Acidi Tannici, Cubebæ, Ammonii Chloridi, Potassi Chloratis, Sodii Bicarbonatis.

Q.—What is the strength of the **Tannic Acid Troche?**
A.—0.06 Gm., 1 gr.

Q.—What is it therapeutically?
A.—Astringent; hæmostatic.

Q.—What is the strength of the **Ammonium Chloride Troche?**
A.—0.1 Gm., 1½ gr.

Q.—What else is there in it?
A.—Ext. Licorice and Syr. Tolu.

Q.—What is the ext. licorice for?
A.—Principally to mask the taste of the ammonium chloride.

Q.—What is the troche therapeutically?
A.—Expectorant.

Q.—What form of Cubeb is used to make the **Troches of Cubeb?**
A.—The oleoresin.

Q.—What else is there in them?
A.—Oil sassafras, ext. licorice, syr. tolu, acacia.

Q.—How much of the oleoresin in each troche?
A.—0.02 Gm., ⅓ gr.

Q.—What are they therapeutically?
A.—Stimulant to mucous surfaces and diuretic.

Q.—How much **Potassium Chlorate** in each troche?
A.—0.15 Gm., 2½ gr.

Q.—What precaution is to be used in the preparation of these troches?

A.—The potassium chlorate must not be triturated dry in the mortar, either alone or with the other ingredients.

Q.—How should they be put together?

A.—Mix the sugar and the tragacanth by trituration, then transfer to a sheet of paper and incorporate the potassium chlorate with a horn or wooden spatula then place in a mortar and add the necessary amount of water to form a mass.

Q.—What are these troches therapeutically?

A.—Antiseptic and stimulant to mucous surfaces.

Q.—How much **Sodium Bicarbonate** in each troche?

A.—0.18 Gm., 3 gr.

Q.—What are they flavored with?

A.—Myristica.

Q.—What are they therapeutically?

A.—Antacid.

N. F. TROCHES

Q.—Name the N. F. troches.

A.—Trochisci Carbonis Ligni; Gambir; Menthæ Piperitæ; Phenolphthaleini; Quininæ Tannatis; Santonini; Santonini Compositi; Sulphuris et Potassii Bitartratis; Ulmi.

Q.—What is the active constituent in the **Trochisci Carbonis Ligni**?

A.—Wood charcoal.

Q.—How much in each troche?

A.—0.3 Gm.

Q.—What are they therapeutically?

A.—Antiseptic. Absorptive.

Q.—What are they flavored with?

A.—Vanillin.

Q.—How much **Gambir** in each **troche**?

A.—0.06 Gm.

Q.—What are they flavored with?

A.—Oil of cinnamon.

Q.—What are they therapeutically?
A.—Astringent.

Q.—What form of **peppermint** is used in making the **troches?**
A.—Oil of peppermint.

Q.—How much in each troche?
A.—0.01 mil.

Q.—What are they therapeutically?
A.—Carminative.

Q.—How much **Phenolphthalein** in each troche?
A.—0.06 Gm.

Q.—In what particular do these troches differ from other troches?
A.—They are colored with carmine.

Q.—Why are they colored?
A.—Because the alkalinity of the saliva would cause the troche to form a red color in the mouth which might unduly alarm the patient.

Q.—What are they flavored with?
A.—Vanillin.

Q.—What are they therapeutically?
A.—Laxative.

Q.—How much **Quinine Tannate** in each troche?
A.—0.06 Gm.

Q.—What is used in masking the **taste?**
A.—Cocoa, vanillin and sodium benzosulphinide.

Q.—What are the synonyms for Sodium Benzosulphinide?
A.—Sodium-Saccharin. Soluble saccharin.

Q.—What are the troches therapeutically?
A.—Antiperiodic; antimalarial; tonic.

Q.—How much **Santonin** in each troche?
A.—0.03 Gm., ½ gr.

Q.—What are they flavored with?
A.—Cocoa and vanillin.

Q.—What are they therapeutically?
A.—Anthelmintic.

Q.—At what time of day should they be administered to children?

A.—At bedtime.

Q.—Why at this time?

A.—Santonin distorts the vision and makes everything appear to be colored yellow. This is a shock to some children. This condition disappears before morning.

Q.—How much Santonin in each of the **Compound Troches of Santonin?**

A.—0.03 Gm., 1/2 gr.

Q.—What other active constituent do they contain?

A.—Mild mercurous chloride. Calomel.

Q.—How much of this does each contain?

A.—0.03 Gm., 1/2 gr.

Q.—What form of Sulphur in **Troches of Sulphur and Cream of Tartar?**

A.—Washed Sulphur.

Q.—How much Sulphur in each troche?

A.—0.3 Gm., 5 gr.

Q.—How much Potassium Bitartrate in each?

A.—0.06 Gm., 1 gr.

Q.—What are these troches flavored with?

A.—Oil of orange.

Q.—What are they therapeutically?

A.—Laxative.

Q.—How much **Elm** is there in each **troche?**

A.—0.2 Gm., 3 1/8 gr.

Q.—What are they flavored with?

A.—Methyl salicylate.

Q.—What are they therapeutically?

A.—Demulcent. Used in sore throat.

MASSÆ—MASSES

Q.—What are Masses?

A.—Plastic mixtures of medicinal substances for internal use.

Q.—How many are official?

A.—Three.

Q.—How are they made?
A.—By simple admixture and by chemical reaction.

Q.—Name those of the U. S. P.
A.—Massa Ferri Carbonatis. Massa Hydrargyri.

Q.—Which of these is made by chemical reaction?
A.—**Mass of Ferrous Carbonate.**

Q.—What is the synonym for this Mass?
A.—Vallet's mass.

Q.—What is this made from?
A.—Ferrous sulphate and monohydrated sodium carbonate.

Q.—What else is used in the preparation?
A.—Clarified honey, sugar, and syrup.

Q.—What are they for?
A.—The honey makes a tenacious mass and the sugar and syrup are to prevent oxidation of the iron.

Q.—What by-product must be washed out of this mass?
A.—Sodium sulphate.

Q.—How much Ferrous Carbonate must the Mass contain?
A.—Not less than 35%.

Q.—Why is carbonic acid gas released in making this mass?
A.—The solution of Ferrous Sulphate is slightly acid in reaction and this reacts with the sodium carbonate.

Q.—How is the mass assayed?
A.—Using N/10 potassium dichromate T. S. with potassium ferricyanide T. S. as an indicator.

Q.—What is the Mass therapeutically?
A.—Hematinic.

Q.—What is the dose?
A.—0.25 Gm.

Q.—What is the synonym for **Massa Hydrargyri?**
A.—Blue mass. Blue pill.

Q.—What form of mercury is used?
A.—Metallic mercury.

Q.—How much does the mass contain?
A.—33%.

Q.—What else is there in the Mass?
A.—Oleate of mercury 1%, glycyrrhiza 10%, althæa 15%, glycerin 9%, honey of rose 32%.

Q.—What is the oleate of mercury for?
A.—To extinguish the mercury.

Q.—How fine must the mercury be?
A.—So that the globules can not be seen under a lens magnifying ten diameters.

Q.—What is the honey of rose for?
A.—To make a tenacious mass and aid in holding the globules of mercury apart.

Q.—What is the glycerin for?
A.—To keep the mass plastic.

Q.—What is the Mass therapeutically?
A.—Laxative; antisyphilitic.

Q.—What is the dose?
A.—0.25 Gm., 4 gr.

Q.—How is the Mass assayed?
A.—Dissolved in sulphuric and nitric acids, oxidized with potassium permanganate T. S., then titrated with potassium sulphocyanate N/10 V. S., using ferric ammonium sulphate T. S. as an indicator.

Q.—Name the N. F. Mass.
A.—**Massa Copaibæ.**

Q.—What is the synonym?
A.—Solidified copaiba.

Q.—How much copaiba does it contain?
A.—94%.

Q.—How is the Mass made?
A.—6% of magnesium oxide is triturated with a little water to render it uniformly damp. The copaiba is then incorporated, after which it is heated on the water-bath for a half hour with frequent stirring.

Q.—Is this simple admixture or chemical reaction?
A.—Probably chemical reaction. Magnesium hydroxide is formed, then reaction with the copaiva acid of the copaiba probably forms magnesium copaivate.

Q.—What is it therapeutically?
A.—Stimulant to mucous surfaces.

Q.—What is the dose?
A.—1 Gm.

OLEOSACCHARA—OIL SUGARS

Q.—What is the English name for **Oleosacchara?**
A.—Oil sugars.

Q.—What oil is used?
A.—Any volatile oil.

Q.—What is the formula?
A.—2 mils of the volatile oil, thoroughly triturated with 100 Gm. of sugar.

Q.—Should these be kept in stock?
A.—No, they are preferably made as needed.

Q.—What are they used for?
A.—As pleasant vehicles for powders, particularly when given to children.

PILULÆ—PILLS

Q.—Define pills.
A.—Round or ovoid masses of medicinal matter intended to be swallowed.

Q.—How large should a pill be?
A.—Not less than 0.06 Gm., 1 gr., nor larger than 0.5 Gm., 8 gr.

Q.—What conditions must characterize pills?
A.—They must be plastic, cohesive, and firm.

Q.—What is the agent called which gives cohesiveness to a pill?
A.—The excipient.

Q.—Name some excipients.
A.—Glucose, honey, syrup, water, soap, glycerite of starch.

Q.—What is meant by a conspurgative?
A.—A dusting powder.

Q.—What is a conspurgative used for?
A.—To keep the pills from sticking to each other and to the box.

Q.—Name some conspurgatives.
A.—Powdered glycyrrhiza, starch, aromatic powder, magnesia, talc.

Q.—What is an "enteric" pill?
A.—One which is intended to pass through the stomach without disintegration and dissolve in the intestines.

Q.—How can a pill be made to do this? Keratin..
A.—By coating it with Salol which is insoluble in the acid juices of the stomach, but which will dissolve in the alkaline fluids of the intestines.

Q.—How many U. S. P. pills are official?
A.—Seven.

Q.—Name them.
A.—Pilulæ Aloes; Asafœtidæ; Catharticæ Compositæ; Ferri Carbonatis; Ferri Iodidi; Phosphori; Rhei Compositæ.

Q.—How much **Aloes** in each pill?
A.—0.13 Gm., 2 gr.

Q.—What is the excipient?
A.—Soap and water.

Q.—What are they therapeutically?
A.—Laxative and cathartic.

Q.—How many are a dose?
A.—Two.

Q.—How much **Asafetida** in each pill?
A.—0.2 Gm., 3½ gr.

Q.—What form of Asafetida should be used?
A.—Only the choicest tears, not the powdered.

Q.—What is the objection to the powdered?
A.—The value lies in the volatile oil and in order to powder the drug it must be heated, which drives off the volatile oil.

Q.—What is the excipient?
A.—Soap and water.

Q.—What are the pills therapeutically?
A.—Antispasmodic (in hysteria) carminative; nervine.

Q.—What is the dose?
A.—Two pills.

Q.—What is there in each **Compound Cathartic Pill?**

A.—Comp. Ext. Colocynth 0.08, Calomel 0.06, Resin of Jalap 0.02, Gamboge 0.015.

Q.—What is the excipient?

A.—Diluted alcohol.

Q.—What is the dose?

A.—Two pills.

Q.—Give three official synonyms for **Pil. Ferri Carbonatis.**

A.—Blaud's pills. Chalybeate Pills. Ferruginous Pills.

Q.—What salt of iron is in the finished pill?

A.—Ferrous Carbonate.

Q.—What is the pill made from?

X **A.**—Granulated ferrous sulphate and potassium carbonate, sugar, tragacanth, althæa, glycerin, water.

Q.—In what order are the ingredients mixed?

A.—The ferrous sulphate is first triturated with the sugar; then the potassium carbonate with a little glycerin and water. Next mix the two and rub them until the mass assumes a green color and the reaction is complete. Add the two powders and incorporate thoroughly.

Q.—What will happen if the pills are rolled out before the reaction is complete?

A.—They will split.

Q.—How long does it take the reaction to go to completion?

A.—About fifteen minutes if the powders are very fine and fairly moist.

Q.—Why is Granular Ferrous Sulphate directed?

A.—Because it is the purest form.

Q.—What is the sugar for?

A.—To keep the iron salt from being oxidized.

Q.—What is the glycerin for?

A.—These pills are usually ordered in rather large numbers and because of their nature would dry and crumble. The glycerin because of its hygroscopic properties attracts moisture and keeps them plastic.

Q.—What salt is permitted to replace Potassium Carbonate in making this pill?

A.—Monohydrated Sodium Carbonate 7.2 Gm. in place of 8.

Q.—Why is this?

A.—Because of market conditions, due to the European war making it difficult to obtain Potassium salts.

Q.—How much Ferrous Carbonate must there be in each finished pill?

A.—Not less than 0.06 Gm.

Q.—How is the amount of Ferrous Carbonate ascertained?

A.—By assay. Dissolve 3 pills in Diluted Sulphuric Acid and dilute with distilled water. Titrate at once with N/10 potassium dichromate V. S. using potassium ferricyanide T. S. as indicator.

Q.—When a Blaud pill is cut open, what color should it show?

A.—Greenish.

Q.—If it shows brownish or reddish, what does it indicate?

A.—That the Iron has been oxidized to ferric iron.

Q.—Should Ferrous Carbonate Pills be stored?

A.—No they should be freshly made as wanted, they are too likely to oxidize.

Q.—What are they therapeutically?

A.—Hematinic.

Q.—What is the dose?

A.—Two pills.

Q.—How should the following prescription be compounded?

℞ Ferrous Sulphate
Potass. Carb. aa dr. ii
Ext. Nux Vom. gr. xl

M. et ft. caps. No. XCVI **Make dry.**

A.—Use only the dried salts, rub together lightly, mixing the extract first with one of the salts. Work rapidly and do **not** attempt to mass.

Q.—What form of Iron is used in making the **Pills of Ferrous Iodide?**

A.—Reduced Iron.

Q.—Why is Reduced Iron selected?

A.—It is in a very fine state of division and the reaction goes on more readily.

Q.—What is used to furnish the Iodide radicle?

A.—Iodine itself. The ferrous iodide is formed by direct reaction.

Q.—What else is used in making the pills?

A.—Glycyrrhiza 4%, ext. glycyrrhiza 1%, sugar 4%, acacia 1%.

Q.—What is the first operation in making the pills?

A.—The iron with a little water and the iodine are triturated together and stirred constantly until the reddish tint has disappeared.

Q.—What is next done?

A.—The powders are thoroughly mixed by trituration and mixed with the iron iodide mixture. The whole mass is then transferred to an evaporating dish on the water-bath and the excess of moisture driven off with constant stirring. When it has acquired a pilular consistence it is rolled into pills.

Q.—Why is an excess of Iron used in making the pills?

A.—In case any Iodine should be liberated by oxidation there is Iron present to take it up.

Q.—How much Ferrous Iodide will there be in each pill?

A.—About 0.061 Gm., 1 gr.

Q.—In what particular do these pills differ from most other official pills?

A.—They are coated.

Q.—Why are they directed to be coated?

A.—To prevent oxidation.

Q.—How is this oxidation likely to come about?

A.—Exposure to the air may release the iodine.

Q.—Is the iodine more susceptible to oxidation than the iron?

A.—Yes.

Q.—What are the pills coated with?

A.—An ethereal solution of balsam of tolu.

Q.—How are the pills to be stored?

A.—In a well-stoppered bottle.

Q.—How are they tested for free Iodine?

A.—Triturated with water and then filtered, to the filtrate is added a few drops of Starch T. S. when only a slight bluish tint should appear.

Q.—What are they therapeutically?
A.—Alterative; hematinic.

Q.—What is the dose?
A.—Two pills.

Q.—How much Phosphorus is there in each **Pill of Phosphorus?**
A.—0.0006 Gm., 1/100 gr.

Q.—Is Phosphorus soluble or insoluble?
A.—Insoluble in the common solvents.

Q.—What liquids will dissolve it?
A.—Carbon disulphide and chloroform.

Q.—Which is used in making the Pill?
A.—Chloroform.

Q.—Why not carbon disulphide?
A.—Because of the very disagreeable odor and its much greater inflammability.

Q.—What else is used in making the pills?
A.—Althæa 6%, acacia 3%, glycerin and water.

Q.—How is the material put together?
A.—Dissolve the phosphorus in chloroform and add the solution to the well-mixed powders, add the water and glycerin at once and form the mass.

Q.—How is the pill finished?
A.—It is coated.

Q.—Why is it coated?
A.—To prevent oxidation.

Q.—What is it coated with?
A.—Ethereal solution of balsam of tolu.

Q.—What is the pill therapeutically?
A.—Tonic.

Q.—What is the dose?
A.—One pill.

Q.—What is there in each **Compound Rhubarb Pill?**
A.—Rhubarb 0.13, aloes 0.1, myrrh 0.06, oil of peppermint 0.005.

Q.—What is the excipient?
A.—Water.

Q.—What is the dose?
A.—Two pills.

Q.—Do the Pills of the U. S. P. differ in any way from those of the N. F.?
A.—No, except in the formulas.

Q.—What prominent property should an excipient have?
A.—It should have a dissolving action on the principal constituents of the pill, as well as imparting cohesiveness and plasticity.

Q.—Will this invariably be the case?
A.—No, for some substances which enter the pills are insoluble, for example, Calomel.

Q.—What objection might be raised to the use of acacia and tragacanth as excipients?
A.—They make a pill so hard that it might pass the alimentary tract without disintegration.

Q.—What is the objection to using wax as an excipient?
A.—It is insoluble in the juices of the stomach.

Q.—What is the proper excipient for resinous substances?
A.—Soap, as it makes the resin more readily soluble and keeps the pill soft.

Q.—For this purpose which is better, vegetable or animal soap?
A.—Animal soap, sometimes called curd-soap, as it seems to make a more tenacious mass.

Q.—What other subtsances may be massed with soap?
A.—Creosote, phenol, camphor.

Q.—How should Pills of Quinine Sulphate be made?
A.—First triturate the Quinine Sulphate with a little tartaric or dilute sulphuric acid, then quickly mass with glucose or glycerite of starch.

Q.—Why is the acid used?
A.—It reduces the bulk and tends to make the Quinine more soluble.

Q.—What should be used as dusting powder?
A.—Starch. It must be white so as not to discolor the pills; for this reason also honey is not used as the excipient.

Q.—Why must special care be given to the making of pills of silver nitrate and potassium permanganate?
A.—These two substances are very easily reduced and organic matter always seeks oxygen. Hence organic matter must not be used.

Q.—What is the proper diluent and dusting powder?
A.—Kaolin.

Q.—What is the proper excipient?
A.—Petrolatum.

Q.—What is the English name for "mica panis"?
A.—Bread crumb.

Q.—Is it ever used as a pill excipient?
A.—Yes, formerly quite extensively used, but now passing into disuse.

Q.—What should always be done with it before mixing it with medicinal substances?
A.—It should be well-washed to remove all salt.

Q.—Why is licorice powder to be preferred to lycopodium as a dusting powder?
A.—It is a better absorbent and has a better taste.

Q.—What precaution must be taken when uncoated pills are dispensed?
A.—To see that they have sufficient dusting powder to prevent their sticking together or to the box.

Q.—What substances might well be coated with Salol?
A.—Those which should arrive in the intestines in a concentrated form as, male fern, santonin, kousso; those which may irritate the mucous lining of the stomach as, arsenic, mercurials, irons, phosphorus; those which may disturb the digestion by forming insoluble compounds with the gastric juice or by rendering it inactive, as mercuric chloride, tannic acid, sugar of lead, calcium sulphide.

Q.—Is the Salol-coating of pills official?
A.—Yes, page 167 of the National Formulary.

Q.—What other coatings are official?
A.—Gelatin, sugar, cocoa, tolu, silver.

Q.—Do these coatings prevent the dissolving of the pills in the stomach?
A.—No, they will all disintegrate in the acid fluids of the stomach. Salol being the only exception.

Q.—Where are the directions found for these coatings?
A.—Page 166 National Formulary.

Q.—What may be used instead of gelatin coating, when pills are so ordered?
A.—They may be enclosed in gelatin capsules, using the smallest sized capsule possible.

Q.—Is this also official?
A.—No, but it amounts to the same thing as gelatin coating and makes rather a better looking pill.

N. F. PILLS

Q.—What is the English for Pilulæ ad Prandium?
A.—Dinner Pills.

Q.—What is to be dispensed when Dinner Pills are prescribed?
A.—Pilulæ Aloes et Mastiches.

Q.—What other Dinner Pills are official?
A.—Chapman's Dinner Pills; Cole's Dinner Pills; and Hall's Dinner Pills.

Q.—Name the other N. F. pills.
A.—Pilulæ Aloes et Asafœtidæ.
Aloes et Ferri.
Aloes et Mastiches.
Aloes et Myrrhæ.
Aloes et Podophylli Compositæ.
Aloes, Hydrargyri et Podophylli.
Aloes, Hydrargyri et Scammonii Compositæ.
Aloini Compositæ.
Aloini, Strychninæ et Belladonnæ.
Aloini, Strychninæ et Belladonnæ Compositæ.
Antidyspepticæ.
Antimonii Compositæ.
Antiperiodicæ.

Antiperiodicæ sine Aloe.
Catharticæ Vegetabiles.
Colocynthidis Compositæ.
Colocynthidis et Hyoscyami.
Colocynthidis et Podophylli.
Digitalis, Scillae et Hydrargyri.
Ferri, Quininæ, Aloes et Nucis Vomicæ.
Ferri, Quininæ, Strychninæ et Arseni Fortiores.
Ferri, Quininæ, Strychninæ et Arseni Mites.
Glycerylis Nitratis.
Laxativæ Compositæ.
Laxativæ Post Partum.
Opii, Digitalis et Quininæ.
Opii et Camphoræ.
Opii et Plumbi.
Rhei.

Q.—What is there in **Chapman's Dinner Pill?**
A.—Aloes 0.097, Mastic 0.097, Ipecac 0.065, oil of fennel 0.015.

Q.—What is the excipient?
A.—Diluted alcohol.

Q.—What is there in **Cole's Dinner Pill?**
A.—Aloes, Mass of Mercury and Jalap each 0.078, Antimony and Potassium Tartrate 0.0013, syrup.

Q.—What is there in **Hall's Dinner Pill?**
A.—Aloes, Ext. Glycyrrhiza, Soap each 0.065 syrup.

Q.—What is there in each **pill of Aloes and Asafetida?**
A.—Aloes, asafetida and soap each 0.09, water.

Q.—What is the dose of these Dinner Pills?
A.—One pill.

Q.—What is there in **Pills of Aloes and Iron?**
A.—Aloes, exsiccated ferrous sulphate, aromatic powder each 0.07, confection of rose.

Q.—What is the dose?
A.—Two pills.

Q.—What is there in **Pills of Aloes and Mastic?**
A.—Aloes 0.13, mastic 0.04, red rose 0.03, diluted alcohol.

Q.—What is the synonym for this pill?
A.—Lady Webster's Dinner Pill.

Q.—What is the dose?
A.—Two pills.

Q.—What is there in **Pills of Aloes and Myrrh?**
A.—Aloes 0.13, myrrh 0.06, aromatic powder 0.04 syrup.

Q.—What is the dose?
A.—2 pills.

Q.—What is there in **Pills of Aloes and Podophyllum Compound?**
A.—Aloes 0.065, resin of podophyllum 0.0325, pilular ext. of belladonna leaves 0.016, ext. nux vomica 0.016.

Q.—What is the synonym?
A.—Janeway's pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Aloes, Mercury and Podophyllum?**
A.—Aloes 0.13, mass of mercury 0.065, resin of podophyllum 0.016.

Q.—What are the synonyms?
A.—Triplex pills. Pilula Triplex.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Compound Pills of Aloes, Mercury and Scammony?**
A.—Aloes 0.055, resin of scammony 0.055, mass of mercury 0.055, croton oil 0.0032, oil of caraway 0.016, tr. aloes and myrrh.

Q.—What is the synonym?
A.—Francis' Triplex Pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Compound Pills of Aloin?**
A.—Aloin 0.0325, resin of podophyllum 0.008, pilular ext. of belladonna 0.016.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pilulæ Aloini, Strychninæ et Belladonnæ?**
A.—Aloin 0.013, strychnine 0.0005, pilular ext. of belladonna 0.008.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Aloin, Strychnine, and Belladonna Compound?**
A.—Aloin 0.013, strychnine 0.0005, pilular ext. belladonna 0.008, ext. cascara sagrada 0.0325.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Antidyspeptic Pills?**
A.—Strychnine 0.0016, ipecac and pilular ext. belladonna each 0.0065, mass of mercury and compound ext. of colocynth each 0.13.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Compound Pills of Antimony?**
A.—Sulphurated antimony, calomel each 0.04, guaiac 0.08, castor oil.

Q.—What is the synonym?
A.—Plummer's pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Antiperiodic Pills?**
A.—Ext. aloes 0.065, rhubarb, angelica fruit each 0.032 inula, saffron, fennel each 0.016, zedoary, cubeb, myrrh, agaric and camphor each 0.008, quinine sulphate 0.09, ext. gentian.

Q.—What is the dose?
A.—1 pill.

Q.—What is the synonym?
A.—Warburg's pills.

Q.—What is there in **Vegetable Cathartic Pills?**
A.—Compound ext. colocynth 0.06, ext. hyoscyamus 0.03, resin of jalap 0.02, ext. leptandra, resin of podophyllum each 0.015, oil of peppermint 0.008 dilute alcohol.

Q.—What is the dose?
A.—2 pills.

Q.—In what particular do these differ from the Compound Cathartic Pills?
A.—They contain no Calomel.

Q.—What common name is sometimes applied to Resin of Podophyllum?
A.—Vegetable calomel.

Q.—What is there in **Compound Pills of Colocynth?**
A.—Ext. colocynth 0.011, aloes, resin of scammony each 0.13, oil of clove 0.015, diluted alcohol.

Q.—What is the synonym?
A.—Pilulæ Cocciæ. Cochia Pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Colocynth and Hysocyamus?**
A.—Ext. colocynth 0.0065, aloes, resin of scammony, ext. hyoscyamus 0.097, oil of clove 0.01.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Colocynth and Podophyllum?**
A.—Compound ext. colocynth 0.162, resin of podophyllum 0.016, syrup.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Digitalis, Squill and Mercury?**
A.—Digitalis, squill, mass of mercury each 0.065, clarified honey.

Q.—What are the synonyms?
A.—Niemeyer's pills for dropsy. Guy's Pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Iron, Quinine and Nux Vomica?**
A.—Exsiccated ferrous sulphate, quinine sulphate, aloes each 0.065, ext. nux vomica 0.016 and ext. gentian.

Q.—What are the synonyms?
A.—Quadruplex pills. Pilulæ Ferri et Quininæ Compositæ.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Stronger Pills of Iron, Quinine, Strychnine, and Arsenic?**
A.—Reduced iron, quinine sulphate each 0.065, strychnine, arsenic trioxide each 0.0013, clarified honey.

Q.—What are the synonyms?
A.—Metallic Pills, Pilulæ Metallorum Amaræ. Bitter Metallic Pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Mild Pills of Iron, Quinine, Strychnine, and Arsenic?**
A.—Reduced iron 0.045, quinine sulphate 0.065, strychnine, arsenic trioxide each 0.0013, clarified honey.

Q.—What is the synonym?
A.—Aitken Tonic Pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Nitroglycerin?**
A.—Spirit of Glyceryl Trinitrate, althæa each 0.065, confection of rose.

Q.—How is the pill put together?
A.—Mix the spirit with the althæa and expose to the air to evaporate the alcohol, then mass with the confection of rose.

Q.—May the alcohol be evaporated by the use of heat?
A.—No.

Q.—What is the synonym?
A.—Pills of Glonoin.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Compound Laxative Pills?**
A.—Aloin 0.013, strychnine 0.0005, pilular ext. belladonna 0.008, ipecac 0.004, glycyrrhiza 0.046, syrup.

Q.—What is the dose?
A.—2 pills.

Q.—What is there in **Postpartum Laxative Pills?**
A.—Compound ext. colocynth 0.11, aloes 0.055, ext. nux vomica 0.025, resin of podophyllum, ipecac each 0.005, ext. hyoscyamus 0.08, diluted alcohol.

Q.—What is the synonym?
A.—Barker's Postpartum Pills.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Opium, Digitalis and Quinine?**
A.—Powdered opium 0.01, digitalis, quinine sulphate each 0.065, clarified honey.

Q.—What is the synonym?
A.—Niemeyer's pills for phthisis.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Opium and Camphor?**
A.—Powdered opium 0.065, camphor 0.13, clarified honey.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Opium and Lead?**
A.—Powdered opium, lead acetate each 0.065, clarified honey.

Q.—What is the dose?
A.—1 pill.

Q.—What is there in **Pills of Rhubarb?**
A.—Rhubarb 0.2, soap 0.06, water.

Q.—What is the dose?
A.—1 pill.

Q.—What must always be done with solid substances which are to be made into pills?
A.—They must be reduced to a very fine powder and well mixed before the excipient is added.

Q.—What official pills are coated?
A.—Pills of Ferrous Iodide and Pills of Phosphorus.

Q.—With what are they coated?
A.—Ethereal solution of balsam of tolu.

Q.—Why are they coated?
A.—To prevent oxidation.

Q.—Name two official pills which are massed with confection of rose.
A.—Pills of aloes and iron and pills of glyceryl nitrate.

Q.—Name an official pill which is massed with castor oil?
A.—Compound pills of antimony.

Q.—Are there any tablets official?
A.—Only one.

Q.—What is it?
A.—**Toxitabellæ Hydrargyri Chloridi Corrosivi.**

Q.—Give the title in English.
A.—Poison Tablets of Corrosive Mercuric Chloride.

Q.—What are the synonyms?
A.—Corrosive Sublimate Tablets. Bichloride Tablets.

Q.—How much mercuric chloride must they contain?
A.—0.5 Gm.

Q.—What shape are the tablets?
A.—Angular, **not** in the form of discs or coins.

Q.—What color should they be?
A.—Blue.

Q.—What is recommended for coloring them?
A.—Sodium indigotindisulphonate.

Q.—What must show on each tablet?
A.—Skull and cross bones and the word "POISON".

Q.—What must appear on the label?
A.—The label must be red and bear the word "Poison," also a statement showing that each tablet has the required amount of mercuric chloride.

Q.—How are they to be dispensed?
A.—In securely stoppered glass containers.

Q.—How are the tablets assayed?
A.—By a modification of the regular assay for Corrosive Sublimate and by the Electrolytic Method.

Q.—Is the Electrolytic Method official?
A.—Yes, found in Part II of the U. S. P. Test No. 4.

Q.—What are the tablets used for?
A.—For making antiseptic washes and solutions.

SOLID PREPARATIONS FOR EXTERNAL USE
UNGUENTUM—OINTMENTS

Q.—Name the classes of solid preparations for external use.
A.—Ointments, cerates, suppositories, plasters, poultices, papers, pastes, glycerogelatins, mulls, paste pencils, inunctions.

Q.—Name those classes found exclusively in the N. F.
A.—Poultices, papers, pastes, glycerogelatins, mulls, paste pencils, inunctions.

Q.—Are there no papers in the U. S. P.?
A.—No, only as a synonym in case Emplastrum Sinapis.

Q.—What is the Latin name for Ointment?
A.—Unguentum.

Q.—Define **ointments.**
A.—Medicinal substances mixed with a fatty vehicle intended to be applied to the skin and melting at body temperature.

Q.—At what temperature should they melt?
A.—About 98° F. or 37° C.

Q.—How many ointments are official?
A.—20 U. S. P., 12 N. F.

Q.—How are they classified as to their penetration?
A.—Epidermatic, those acting on the surface only; Endermatic, those penetrating into but not through the skin; Diadermatic, those penetrating through the true skin and giving systemic action.

Q.—What vehicle is used for Epidermatic ointments?
A.—Petrolatum or paraffin.

Q.—What medicinal agents are carried in Epidermatic ointments.
A.—Emollients and antiseptics.

Q.—What vehicle is used in Endermatic ointments?
A.—Vegetable oils and the true fats, lard, and suet.

Q.—How should ointments be stored?
A.—In porcelain or glass jars in a cool, dry place.

Q.—What vehicle is used where Diadermatic or systemic effect is wanted?
A.—Lanolin, adeps lanæ.

Q.—Name the vehicles used in making ointments.
A.—Benzoinated lard, suet, benzoinated suet, lanolin, wax, paraffin, cetaceum, rosin, petrolatum.

Q.—What is rancidity?
A.—A decomposition of fat resulting in the presence of free acid.

Q.—What precautions may be taken to retard or prevent rancidity?
A.—As this condition is induced by heat and moisture the fats should be entirely free from water and be stored in a dry, cool place.

Q.—How may ointments be classified as to method of preparing?
A.—(1) Simple admixture; (2) fusion; (3) chemical reaction.

Q.—Name those U. S. P. made by admixture.
A.—Unguentum Acidi Tannici; Belladonnæ; Gallæ; Hydrargyri; Hydrargyri Ammoniati; Hydrargyri Dilutum; Hydrargyri Oxidi Flavi; Iodi; Iodoformi; Stramonii; Sulphuris.

Q.—Name the U. S. P. ointments made by Fusion.
A.—Unguentum (simple); Unguentum Acidi Borici; Aquæ Rosæ; Chrysarobini; Diachylon; Phenolis; Picis Liquidæ; Zinci Oxidi.

Q.—Name the U. S. P. ointment made by Chemical Reaction.
A.—**Unguentum Hydrargyri Nitratis.**

Q.—What is the strength of **Ung. Acidi Tannici?**
A.—20% tannic acid.

Q.—What else is there in it?
A.—20% glycerin and 60% Ointment (simple).

Q.—What is it therapeutically?
A.—Astringent.

Q.—How is the ointment put together?
A.—The glycerin is heated on the water-bath and the tannic acid dissolved in it. Then the solution is thoroughly mixed with the ointment.

Q.—What precaution is directed?
A.—Avoid contact with anything iron.

Q.—Why is this necessary?
A.—In the presence of moisture tannic acid reacts with iron to form black iron tannate.

Q.—What form of Belladonna is used in **Belladonna Oint.**?
A.—Pilular extract of Belladonna Leaves.

Q.—Is there another form of Belladonna Extract?
A.—Yes, the powdered extract.

Q.—What is the objection to this in the ointment?
A.—The extract is not so readily dissolved, hence it is too likely to make a gritty ointment.

Q.—What percentage of Extract is there in the Ointment?
A.—10%.

Q.—What else is there in it?
A.—Diluted alcohol 5%, hydrous wool fat 30%, benzoinated lard 55%.

Q.—What is the diluted alcohol for?
A.—To soften the Extract so it may be more readily and thoroughly distributed through the mixture.

Q.—What is the Hydrous Wool Fat for?
A.—To take up the moisture of the diluted alcohol and to aid in the penetration of the skin.

Q.—Which is used first in the mixture, the lanolin or the lard?
A.—The lanolin.

Q.—What is the Ointment therapeutically?
A.—Sedative and anodyne.

Q.—What is the strength of **Ungt. Gallæ**?
A.—20%.

Q.—What is the vehicle?
A.—Ointment.

Q.—What precaution is to be taken in its preparation?
A.—Avoid metallic contact.

Q.—Why this precaution?
A.—It will react with metals and form colored products.

Q.—What is it therapeutically?
A.—Astringent.

Q.—What form of mercury is used in **Ungt. Hydrargyri?**
A.—Metallic mercury.

Q.—How much mercury is used?
A.—50%.

Q.—What else is there in the ointment?
A.—2% oleate of mercury, 23% prepared suet, 25% benzoinated lard.

Q.—What is the oleate for?
A.—For the purpose of finely dividing the mercury.

Q.—How finely must the mercury be divided?
A.—So the globules are not visible under a lens magnifying ten diameters.

Q.—Why is it necessary to have the mercury so finely divided?
A.—Mercury is active only when in a finely divided state.

Q.—What is this ointment therapeutically?
A.—Antisyphilitic, parasiticide.

Q.—Outline the assay process for this ointment.
A.—Take a definite weight, melt it, add purified petroleum benzin and when the mercury settles out decant the benzin. Wash mercury with hydrochloric acid, then with distilled water, dry and weigh.

Q.—Is it ever prescribed in divided doses?
A.—Yes, they are sometimes called "mercury rubs."

Q.—How is it dispensed when so ordered?
A.—Each dose is weighed and wrapped in waxed paper.

Q.—How is it administered?
A.—Rubbed into the armpits and groins.

Q.—Why is it so applied?
A.—For its systemic effect when mercury treatment by mouth has disarranged digestion. It is rubbed in first at one point then at another as suggested above.

Q.—What is another name for this ointment?
A.—Unguentum Pediculi. Ungt. Pediculosis.

Q.—What other preparation does this enter?
A.—**Ungt. Hydrargyri Dilutum.**

Q.—What is the synonym for **Ungt. Hydrargyri Ammoniati?**
A.—Ointment of White Precipitate.

Q.—What is its strength?
A.—10% of ammoniated mercury.

Q.—What else is there in the Ointment?
A.—White petrolatum 50%, hydrous wool fat 40%.

Q.—How is it put together?
A.—Melt the petrolatum and thoroughly levigate the ammoniated mercury with a portion of it, then add the balance of the melted petrolatum, now mix well with the lanolin and stir until the mixture congeals.

Q.—What is its therapeutic use?
A.—Skin stimulant used in sluggish diseases of the skin.

Q.—What is the strength of **Ungt. Hydrargyri Dilutum?**
A.—30% of metallic mercury.

Q.—How is it prepared?
A.—By thoroughly mixing 60% of the official mercurial ointment and 40% of petrolatum.

Q.—What is the synonym for this ointment?
A.—Blue ointment.

Q.—What change in this formula is permitted by U. S. P.?
A.—In southern latitudes or in warm seasons, 5% of the petrolatum may be replaced by yellow wax.

Q.—What is the assay process for this ointment?
A.—The method is exactly the same as for the stronger ointment. This one must contain not less than 29% nor more than 31% of metallic mercury.

Q.—How do Ungt. Hydrargyri U. S. P. and Ungt. Hydrargyri P. I. differ?
A.—The U. S. P. contains 50% mercury: The P. I. 30% which is the strength of the U. S. P. dilute ointment.

Q.—What is the strength of **Ungt. Hydrargyri Oxidi Flavi?**
A.—10% yellow oxide of mercury.

Q.—What else is there in the ointment?
A.—10% water, 40% each hydrous wool fat and petrolatum.

Q.—Why is the water used?
A.—To levigate the oxide. It must be rubbed until it is perfectly smooth.

Q.—Is the lanolin or petrolatum added next?
A.—The lanolin because it will readily absorb the water.

Q.—Why is lard not used in this?
A.—Because of the tendency of the lard to reduce the oxide.

Q.—What is the ointment therapeutically?
A.—Antiseptic and germicide.

Q.—What is Pagenstecher's ointment?
A.—Ointment of yellow mercuric oxide, the oxide being freshly precipitated and incorporated before it has a chance to dry, hence there is no chance for gritty particles in the ointment.

Q.—How much Iodine in **Ungt. Iodi?**
A.—4%.

Q.—What else is there in the ointment?
A.—4% potassium iodide, 12% glycerin, 80% benz. lard.

Q.—What is the purpose of the potassium iodide and the glycerin?
A.—To dissolve the iodine.

Q.—What kind of a mortar is this to be made in?
A.—Glass.

Q.—What is the objection to wedgewood mortars?
A.—They absorb some of the iodine.

Q.—What precaution must be taken in preparing this?
A.—Avoid all contact with metallic utensils or containers.

Q.—What does the U. S. P. direct regarding the dispensing of this ointment?
A.—It must not be dispensed unless recently made.

Q.—What is the ointment therapeutically?
A.—Counterirritant, antiseptic, absorbent.

Q.—What is the strength of **Ungt. Iodoformi?**
A.—10% iodoform.

Q.—What is the vehicle?
A.—Benzoinated lard.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What form of Stramonium is used in the **Ungt. Stramonii?**
A.—Pilular Extract of Stramonium.

Q.—How much is used?
A.—10%.

Q.—What else is there in the ointment?
A.—5% diluted alcohol, 20% lanolin, 65% benzoinated lard.

Q.—What kind of Sulphur is used in **Ungt. Sulphuris?**
A.—Sublimed Sulphur.

Q.—What is the strength?
A.—15% of sublimed sulphur.

Q.—What is the vehicle?
A.—Benzoinated lard.

Q.—What is it therapeutically?
A.—Parasiticide.

Q.—What is the formula for **Unguentum?**
A.—White wax 20%, benzoinated lard 80%.

Q.—What change in this formula is permitted?
A.—For use in southern latitudes or during the warm season in other localities, 5% of the lard or more if necessary may be replaced by white wax.

Q.—What is the synonym?
A.—Simple ointment.

Q.—What is the strength of **Ungt. Acidi Borici?**
A.—10% boric acid.

Q.—What is the vehicle?
A.—Paraffin 5%, benzoinated lard 85%.

Q.—How is it put together?
A.—Melt the lard and paraffin together. Pour a portion onto the boric acid and rub well in a warm mortar, add the rest and stir until congealed.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What are the common names for **Ungt. Aquæ Rosæ?**
A.—Cold cream, Ungt. Refrigerans.

Q.—What is there in it?
A.—12.5% spermaceti, 12% white wax, 56% exp. oil almond, 0.5% borax, stronger rose water 19%.

Q.—How is it put together?
A.—The spermaceti and the white wax in fine pieces are melted on the water-bath, then the oil is added and the whole is stirred until the mixture and temperature are uniform. The borax is dissolved in the stronger rose water and warmed to the temperature of the oil mixture. The solution of borax is added to the oil mixture and stirred until it congeals.

Q.—What is the borax for?
A.—It is alkaline, hence saponifies some of the oil and makes a whiter preparation.

Q.—What other use is made of Cold Cream than as a toilet preparation?
A.—Some physicians use it as a vehicle to carry other medicinal agents.

Q.—In case it is so prescribed, what care must be taken?
A.—To see that there are no chemicals used which might react with the borax.

Q.—What is the proper thing to do in such cases?
A.—Have a Cold Cream in which the borax has been omitted.

Q.—Has the preparation any therapeutic value?
A.—It has, the large content of almond oil makes it a skin nutritive.

Q.—What substitution do some druggists make in this?
A.—They use a mineral oil, liquid petrolatum, in place of the almond oil.

Q.—Will this do just as well?
A.—No, there is no nutritive value in mineral oil.

Q.—What other objection is there?
A.—It is said to encourage a growth of hair.

Q.—What is the object of using mineral oil?
A.—It is cheaper; not being a fat it is not likely to become rancid.

Q.—Does it make a nice looking preparation?
A.—Yes, it is bright and glossy.

Q.—Is there a legitimate place and use for such a cream?
A.—Yes, it may be used for the removal of grease paint.

Q.—What will happen if considerable quantities of powders, either mineral or vegetable are added to Cold Cream?
A.—The water will be forced out.

Q.—Why should it not be strirred with an egg-beater?
A.—This also has a tendency to throw the water out, if not while making, it will appear on the surface in a day or two.

Q.—What will happen if the mixture is not stirred?
A.—It will be granular and separate in layers.

Q.—Why is not the oil of rose added to perfume it in place of adding stronger rose water?
A.—The water makes it softer and more creamy.

Q.—What decomposition is likely to take place in Cold Cream?
A.—It may become rancid.

Q.—If the Cream has been chilled, what must be done before incorporating other ingredients?
A.—It should be slightly warmed.

Q.—What is meant by rancidity?
A.—A decomposition of fats whereby acid is freed and this is usually indicated by a disagreeable odor.

Q.—What is the strength of **Ungt. Chrysarobini?**
A.—6%.

Q.—What is the vehicle?
A.—Benzoinated lard.

Q.—How is it put together?
A.—Melt the lard and triturate the chrysarobin, heat the mixture on the water-bath for 20 minutes with occasional stirring, strain and stir until congealed.

Q.—What is this ointment therapeutically?
A.—Parasiticide.

Q.—What common name is applied to **Ungt. Diachylon?**
A.—Hebra's ointment.

Q.—What is there in it?
A.—Lead plaster 50%, white petrolatum 49%, oil of lavender 1%.

Q.—How is it put together?
A.—Melt the plaster and white petrolatum by gentle heat, strain the mixture allow to cool, but not congeal, stir in the oil.

Q.—What care should be taken to prepare a satisfactoy diachylon ointment?
A.—The lead plaster should be fresh or the darkened exterior removed.

Q.—What change has been made in the formula?
A.—White petrolatum is used in place of olive oil.

Q.—Is this an improvement?
A.—Decidedly yes, now there is little chance for rancidity.

Q.—What use is made of the ointment?
A.—Used in the treatment of eczema.

Q.—What is the synonym for **Ungt. Phenolis?**
A.—Ointment of Carbolic Acid.

Q.—What is its strength?
A.—2.25% of Liquefied phenol.

Q.—What is the strength of Liquefied Phenol?
A.—87% of absolute phenol.

Q.—What is the vehicle in this ointment?
A.—Ointment.

Q.—What precaution should be taken in the use of this ointment?
A.—It should not be covered and used for any length of time for it is likely to cause the development of phenol gangrene.

Q.—What is the strength of **Ungt. Picis Liquidæ?**
A.—50% tar.

Q.—What is the vehicle?
A.—Yellow wax 15%, lard 35%.

Q.—How is it put together?
A.—Melt the wax, add the lard and to the melted mixture add the tar previously warmed. Incorporate thoroughly and strain through muslin. Stir until congealed.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is the strength of **Ungt. Zinci Oxidi?**
A.—20%.

Q.—What is the vehicle?
A.—Benzoinated lard.

Q.—How is it put together?
A.—Melt the lard, triturate the oxide with about an equal weight of melted lard, in a warm mortar. Incorporate the rest of the lard. Strain, if necessary and stir until it congeals.

Q.—What is it therapeutically?
A.—Astringent and antiseptic.

Q.—What is the common name for **Ungt. Hydrargyri Nitratis?**
A.—Citrine ointment.

Q.—What is used in making it?
A.—Mercury, nitric acid, and lard.

Q.—How is the lard treated?
A.—Melted and mixed with nitric acid.

Q.—What does this form?
A.—Elaidin.

Q.—What is Elaidin?
A.—A compound isomeric with Olein, made up of the glyceryl radicle and the elaidic acid radicle. It forms when oleic acid or oleates are oxidized.

Q.—Why is it necessary to form this compound?
A.—Because the lard, which is an oleic acid compound has such an affinity for the NO_2 radicle that if this affinity is not satisfied it will decompose the mercuric nitrate, so that it may be oxidized. Therefore it is oxidized before the mercuric nitrate is added.

Q.—What is the real difference between Olein in the lard and Elaidin which is formed?
A.—Their chemical formulas are the same but olein melts at 14° C while elaidin melts at 45° C.

Q.—Where does the ointment get the name "citrine"?
A.—From the color, the color of the citrus fruits.

Q.—What precaution is to be observed in preparing this?
A.—All contact with metallic apparatus must be avoided.

N. F. OINTMENTS

Q.—What are the synonyms for **Ungt. Calaminæ?**
A.—Turner's Cerate, Ungt. Zinci Carbonatis Crudi, Ungt. Calaminare.

Q.—What is its strength?
A.—17% prepared calamine.

Q.—What is the vehicle?
A.—Ointment.

Q.—What is the strength of **Ungt. Camphoræ?**
A.—22%.

Q.—What is the vehicle?
A.—White wax 11%, lard 67%.

Q.—How is it put together?
A.—Melt the wax and lard with gentle heat, dissolve the camphor in the melted mixture without further heat, stir until cold.

Q.—What are the synonyms for **Ungt. Fuscum?**
A.—Ungt. Matris, Mother's Salve.

Q.—What is there in it?
A.—Camphorated brown plaster 50%, olive oil and prepared suet, each 25%.

Q.—How is it put together?
A.—Melt the several ingredients together and stir until the ointment is cold.

Q.—What is the strength of **Ungt. Hydrargyri Oxidi Rubri?**
A.—10%.

Q.—What else is there in it?
A.—Water, lanolin and petrolatum.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What precaution must be taken in preparing it?
A.—Avoid metallic contact.

Q.—What form of tar is used in **Ungt. Picis Compositum?**
A.—Rectified oil of tar.

Q.—What is the strength in Rectified Oil of Tar?
A.—4%.

Q.—What else is there in the ointment?
A.—Tr. Benzoin 2%, Zinc Oxide 3%, Yellow Wax 25%, lard 32%, cottonseed oil 34%.

Q.—How is the ointment put together?
A.—Mix the wax, lard and oil at gentle heat, add Tr. benzoin, withdraw heat, then add the oil of tar and finally add the zinc oxide and stir until cool.

Q.—What is the strength of **Ungt. Plumbi Iodidi?**
A.—10%.

Q.—What is it used for?
A.—As a stimulating application to indolent sores and ulcers.

Q.—What untoward results may attend its long use?
A.—If spread over a large raw surface and used for a long time sufficient lead may be absorbed to cause chronic lead poisoning.

Q.—What is the strength of **Ungt. Potassii Iodidi?**
A.—10%.

Q.—What else is there in the ointment?
A.—Sodium thiosulphate 1%, water 9%, benzoinated lard.

Q.—What is the sodium thiosulphate for?
A.—To insure a white ointment.

Q.—Why is this necessary, all the ingredients are white or colorless?
A.—Rancidity in the lard may release acid which attacks the potassium iodide releasing iodine which would color the ointment unless the thiosulphate were there to react with the free iodine to form a colorless compound.

Q.—What is the strength of **Ungt. Resorcinol Compositum?**
A.—6% of resorcinol.

Q.—What else is there in it?
A.—Zinc oxide, bismuth subnitrate, rectified oil of birch tar, each 6%, yellow wax 10%, petrolatum 25%, wool fat 28%, glycerin 13%.

Q.—How is it put together?

A.—Melt the yellow wax and anhydrous wool fat on the water bath. Rub the zinc oxide and bismuth subnitrate with the petrolatum until smooth, then add it to the melted mixture. Dissolve the resorcinol in the glycerin, incorporate the solution with the warm mixture, add the oil and stir until congealed.

Q.—What form of Sulphur is used in **Ungt. Sulphuris Alkalinum?**

A.—Sublimed sulphur.

Q.—What is the per cent of Sulphur?

A.—20%.

Q.—What else is there in it?

A.—10% potassium carbonate, 5% water, 65% benz. lard.

Q.—How is it put together?

A.—Rub the sulphur, potassium carbonate and water until a smooth paste is formed, then incorporate the benzoinated lard.

Q.—What form of Sulphur is used in **Ungt. Sulphuris Compositus?**

A.—Sublimed sulphur.

Q.—What is the strength?

A.—15%.

Q.—What else is there in it?

A.—Ppt. calcium carbonate 10%, oil of cade 15%, soft soap and lard, each 30%.

Q.—How is it put together?

A.—Mix the lard, soft soap and oil of cade, then gradually incorporate the powders, rub till smooth.

Q.—What is the strength of **Ungt. Veratrinæ?**

A.—4%.

Q.—What else is there in it?

A.—6% expressed oil of almonds, 90% benzoinated lard.

Q.—What is the oil for?

A.—To finely divide the veratrine so that it may be evenly and thoroughly mixed with the vehicle.

Q.—What is Veratrine?

A.—A mixture of alkaloids.

Q.—What is the ointment therapeutically?
A.—Irritant and parasiticide.

Q.—What is the strength of **Ungt. Zinci Stearatis?**
A.—50%.

Q.—What is the vehicle?
A.—White petrolatum.

CERATA—CERATES

Q.—What are Cerates?
A.—Preparations of medicinal substances having vehicles containing considerable wax. They soften but do not melt at body temperature.

Q.—By what methods are they prepared?
A.—Fusion and admixture; maceration and admixture.

Q.—What ingredient do they all contain?
A.—Wax.

Q.—How many are official?
A.—Six, 3 U. S. P. and 3 N. F.

Q.—Name the U. S. P. cerates.
A.—Ceratum: Ceratum Resinæ, Cantharidis.

Q.—What is the formula for **Ceratum?**
A.—White wax 30%, benzoinated lard 70%.

Q.—How is it put together?
A.—Melt the white wax by the heat of the water-bath, add the lard and continue the heat until liquefied, strain and stir constantly until congealed.

Q.—What deviation from this formula is authorized?
A.—In southern latitudes and during the heated season 5% of the lard may be replaced by white wax.

Q.—What is the synonym for this preparation?
A.—Simple cerate.

Q.—What is the synonym for **Ceratum Cantharidis?**
A.—Blistering cerate.

Q.—What is the strength in Cantharides?
A.—35%.

Q.—What else is there in it?
A.—Glacial acetic acid, oil of turpentine, yellow wax, rosin, benzoinated lard.

Q.—How is it put together?
A.—The cantharides is mixed with the glacial acetic acid and the oil of turpentine and allowed to macerate in a warm place for 48 hours. The wax, lard and rosin are mixed, melted and strained, to this the macerated cantharides is added and the whole heated on the water-bath until it weighs 100%. Then stir until the cerate is firm.

Q.—Why is the cantharides macerated?
A.—To extract and facilitate the distribution of the active constituent in the cantharides.

Q.—What is the active constituent?
A.—Cantharidin, a lactone of cantharidic acid.

Q.—Why is the heat limited to water-bath heat?
A.—The cantharidin is volatile at 100°C.

Q.—What preparation does this Cerate enter?
A.—Emplastrum Cantharidis.

Q.—What is the synonym for **Ceratum Resinæ?**
A.—Basilicon Ointment.

Q.—What is there in it?
A.—Rosin 35%, yellow wax 15%, lard 50%.

Q.—What deviation from this formula is permitted?
A.—In cold weather 53% lard and 12% wax may be used.

Q.—What official preparation does this enter?
A.—Linimentum Terebinthinæ.

N. F. CERATES

Q.—Name the Cerates of the N. F.
A.—Ceratum Camphoræ, Plumbi Subacetatis, Resinæ Compositum.

Q.—What is there in **Cerat. Camphoræ?**
A.—Camphor liniment 10%, white wax 35%, white petrolatum 15%, benzoinated lard 40%.

Q.—What is the synonym for **Cerat. Plumbi Subacetatis?**
A.—Goulard's Cerate.

Q.—What is there in it?
A.—Solution of lead subacetate, woolfat and white wax each 20%, white petrolatum 38%, camphor 2%.

Q.—How is it put together?
A.—Melt the petrolatum and wax on the water-bath, remove the heat, dissolve the camphor in the warm mixture, add the woolfat, mix thoroughly, then gradually incorporate the solution of lead subacetate.

Q.—What is the synonym for **Cerat. Resinæ Compositum?**
A.—Deshler's Salve.

Q.—What is there in it?
A.—Rosin, yellow wax, each 22.5%, prepared suet 30%, turpentine 11.5%, linseed oil 13.5%.

Q.—What kind of turpentine is used?
A.—The oleoresin.

Q.—Why are the two resin cerates strained?
A.—Because of impurities which are generally present in the rosin.

Q.—What are the rosin cerates therapeutically?
A.—Stimulant to sluggish ulcers.

SUPPOSITORIA—SUPPOSITORIES

Q.—Define Suppositories.
A.—Suitably shaped solid medicated masses of various weights and shapes adapted for introduction into the various orifices of the human body and melting or softening at body temperature.

Q.—What vehicles are usually employed?
A.—Oil of theobroma, glycerinated gelatin or sodium stearate.

Q.—Name the three official forms of suppositories.
A.—Rectal, urethral and vaginal.

Q.—What are the shapes?
A.—Rectal are cone-shaped.
Urethral are pencil-shaped, pointed at one end.
Vaginal are globular or oviform.

Q.—What is the weight of rectal suppositories?
A.—2 Gm.

Q.—What is the length of urethral suppositories?
A.—They may be either 7 cm. or 14 cm.

Q.—What is their weight?
A.—If made of glycerogelatin the 7 cm. weigh 2 Gm., the 14 cm. 4 Gm. If made from cacao butter they weigh about half as much.

Q.—What is another name for urethral suppositories?
A.—Bougies.

Q.—What is the weight of the vaginal suppositories?
A.—10 Gm. if glycerogelatin, 4 Gm. if cacao butter.

Q.—By what three methods are they made?
A.—By fusion and pouring into moulds, by cold compression in moulds or rolled by hand.

Q.—In forming by hand what addition may be made to keep the mass plastic?
A.—A little expressed oil of almond.

Q.—Name some substances which have a softening effect on oil of theobroma.
A.—Phenol and chloral hydrate.

Q.—What addition is made to the vehicle in case these are in the suppository?
A.—10% to 15% spermaceti, but care must be taken not to raise the melting above 37° C.

Q.—How should the moulds be treated before pouring in suppositories of glycerinated gelatin?
A.—Greased with a little petrolatum.

Q.—What is usually added to the glycerinated gelatin in making suppositories?
A.—Water and glycerin.

Q.—What may be substituted for these to make a firmer consistence?
A.—Mucilage of acacia.

Q.—What dusting powder is used with cacao butter suppositories?
A.—Lycopodium.

Q.—How should glycerinated gelatin suppositories be treated before inserting?

A.—Dipped in warm water otherwise they adhere to mucous membrane much the same as does rubber.

Q.—What U. S. P. suppositories are official?

A.—**Glycerin suppositories.**

Q.—What is the formula for 10 suppositories?

A.—Glycerin 30 Gm., monohydrated sodium carbonate 0.5 Gm., stearic acid 2 Gm., water 5 mils.

Q.—What is the vehicle in these?

A.—Sodium stearate.

Q.—What N. F. suppository is official?

A.—**Suppositories of Boroglycerin.**

Q.—What do they contain?

A.—20 parts glycerinated gelatin, 15 parts glycerite of boroglycerin, 15 parts glycerin.

Q.—What is the objection to suppository shells?

A.—None of the medicinal matter can be absorbed until the shell is melted, then the medicament may be so concentrated as to be irritating instead of healing.

Q.—How are glycerin suppositories best dispensed and stored?

A.—In tightly closed containers, homeopathic vials, because they are so hygroscopic.

Q.—What is the objection to making iodoform suppositories with heat?

A.—If there is just a little too much heat the iodoform will form in lumps in the cacao butter.

Q.—Why are tannic acid suppositories best made by a cold process?

A.—The heat tends to make the tannic acid form tough masses.

Q.—By what other name are vaginal suppositories sometimes called?

A.—Pessaries or medicated pessaries.

Q.—Why is glycerinated gelatin usually preferred to cacao butter in making urethral suppositories?

A.—Because it is so much less liable to break in handling.

Q.—What are **coryza suppositories?**

A.—Suppositories of cacao butter with antiseptics for insertion in the nose.

Q.—What are **politzer plugs?**

A.—Pellets of greased cotton with thread attached for insertion in the ear.

EMPLASTRA—PLASTERS

Q.—Define plasters.

A.—Mixtures of medicinal agents with rubber, resinous or other ingredients, which at the normal temperature of the body, soften and become adhesive.

Q.—What is the principal vehicle used in the official plasters?

A.—Lead plaster.

Q.—What two classes of plasters are official?

A.—Spread plasters and plaster masses.

Q.—What are plasters usually spread on?

A.—Leather, paper, muslin, Holland, or rubber plaster.

Q.—Why is a plaster with a lead plaster vehicle better than one with rubber vehicle?

A.—Because it gives up its medicinal constituents more readily.

Q.—Why are porous plasters of particular value?

A.—They permit the escape of the exhalations of the skin, thus not permitting maceration.

Q.—How many plasters are official?

A.—7 U. S. P., 2 N. F.

Q.—Name the U. S. P. plasters.

A.—Emplastrum Belladonnæ, Cantharidis, Capsici, Elasticum, Plumbi, Resinæ, Sinapis.

Q.—Which of these are spread plasters?

A.—Cantharidis, Capsici, Elasticum, Sinapis.

Q.—How does the U. S. P. define **Emp. Belladonnæ?**

A.—An adhesive plaster containing 30% of ext. belladonna leaves and yielding not less than 0.35% nor more than 0.4% of alkaloids from belladonna.

Q.—What is the plaster therapeutically?

A.—Anodyne, sedative.

Q.—How is **Emp. Cantharidis** prepared?
A.—By spreading Cantharides Cerate on Rosin Plaster.

Q.—How much Cantharidal Cerate must be used?
A.—0.1 Gm. for each sq. cm.

Q.—What are the common names for this plaster?
A.—Blistering plaster, Emp. Lyttæ.

Q.—What are the U. S. P. directions about dispensing this plaster?
A.—It is not to be dispensed unless recently prepared.

Q.—What is it therapeutically?
A.—Counter-irritant.

Q.—What form of Capsicum is used in preparing the **Emp. Capsici?**
A.—Oleoresin of Capsicum.

Q.—How is it prepared?
A.—By spreading the oleoresin on Rubber Plaster.

Q.—How much Oleoresin is to be used?
A.—0.25 Gm. on each 15 sq. cm.

Q.—What is it therapeutically?
A.—Rubefacient.

Q.—How does the U. S. P. describe **Emp. Elasticum?**
A.—A mixture of rubber, resins, and waxes, with a filler of absorbent powder, such as orris root or starch, mechanically mixed and spread upon cloth or other fabric.

Q.—What is the synonym for **Emp. Plumbi?**
A.—Diachylon plaster.

Q.—What is it made from?
A.—Lead oxide, olive oil, lard and boiling water.

Q.—What is the chemical composition of the finished plaster?
A.—Principally lead oleate.

Q.—What by-product is formed in the making of this plaster?
A.—Glycerin.

Q.—Where does the glycerin come from?
A.—From the lard and olive oil which are compounds of glyceryl.

Q.—Into what official preparations does this plaster enter?
A.—Emp. Resina; Ungt. Diachylon.

Q.—What is the synonym for **Emp. Resinæ?**
A.—Adhesive plaster.

Q.—From what is it made?
A.—Rosin 14%, lead plaster 80%, yellow wax 6%.

Q.—What is the synonym for **Emp. Sinapis?**
A.—Mustard paper.

Q.—How does the U. S. P. describe this plaster?
A.—A uniform mixture of powdered black mustard (deprived of its fixed oil) and a solution of rubber, spread on paper, cotton cloth or other fabric.

Q.—How must it be stored?
A.—In tightly closed containers.

Q.—How is the seed deprived of its fixed oil?
A.—Exhausted with purified petroleum benzin.

Q.—What is the active constituent of the plaster?
A.—Allyl isothiocyanate. Volatile oil of mustard.

Q.—Does it exist as such in the seed?
A.—No, it is formed by the action of a ferment (myrosin) on a glucoside (sinigrin, potassium myronate) in the presence of moisture.

Q.—How much powdered mustard seed must be used?
A.—100 sq. cm. must have not less than 2.5 Gm. oil-free powder.

Q.—Why is the plaster moistened in tepid water before being applied?
A.—To start the reaction which forms the volatile oil of mustard.

Q.—What will be the result if the water is too hot?
A.—The ferment will be destroyed and no oil will form.

Q.—How soon after applying should the effect of the plaster be noticeable?
A.—Within five minutes.

N. F. PLASTERS

Q.—Name the plasters of the N. F.
A.—Emplastrum Fuscum Camphoratum, Saponis.

Q.—What is the synonym for **Emp. Fuscum Camphoratum?**
A.—Camphorated mother's plaster.

Q.—What is it made from?
A.—Red oxide of lead 30%, olive oil 60%, yellow wax 15%, camphor 1%.

Q.—How is it made?
A.—The lead and oil are first heated together, then boiled in a metallic container until the mixture begins to turn brown. When a drop will congeal in cold water, the mixture is removed from the heat. Add the wax cut in small pieces, then the camphor which has been rubbed to a paste with some of the olive oil.

Q.—Into what other preparation does this enter?
A.—Ungt. Fuscum, 50%.

Q.—What is there in **Emp. Saponis?**
A.—Soap 10%, lead plaster 90%.

Q.—How is it made?
A.—Rub the soap with enough water to make it semi-liquid, then mix it with the melted lead plaster and thoroughly incorporate by stirring. Evaporate to the consistence of plaster.

CATAPLASMATA—POULTICES

Q.—What is the English name for Cataplasm?
A.—Poultice.

Q.—Are any official?
A.—Yes, one.

Q.—What is the name?
A.—Cataplasma Kaolini.

Q.—Is it official in the U. S. P. or N. F.?
A.—In the N. F.

Q.—What is the value of a poultice?
A.—It supplies heat and moisture to inflamed parts.

Q.—What is there in **Cataplasma Kaolini?**
A.—Kaolin 56.5%, boric acid 4.5%, methyl salicylate 0.2%, thymol and oil of peppermint each 0.05%, glycerin 38.7%.

Q.—How is the Kaolin treated?
A.—Dried at 110° C.

Q.—Why is it so treated?
A.—To remove moisture to prevent reaction in the other ingredients.

Q.—What causes the pink color sometimes seen in the cataplasma?
A.—Said to be due to iron in the kaolin.

Q.—How is it used?
A.—Heated as hot as the patient can stand it then applied thickly over gauze to the affected part and well covered.

CHARTÆ—PAPERS

Q.—What is the English name for Charta?
A.—Paper.

Q.—What are they?
A.—Strips of unsized paper which have been saturated with solutions of medicinal substances then dried.

Q.—How many are official?
A.—One.

Q.—Name it.
A.—**Charta Potassii Nitratis.** Potassium nitrate paper.

Q.—Is it U. S. P. or N. F.?
A.—N. F.

Q.—How is it prepared?
A.—A solution of 20 parts potassium nitrate and 80 parts of water is made. In this strips of unsized white paper are soaked, then dried.

Q.—What use is made of this paper?
A.—Used in the treatment of asthma.

Q.—How is it used?
A.—The paper is burned and the fumes inhaled.

Q.—What popular application was formerly official as a Charta?

A.—Charta Sinapis, mustard paper.

Q.—Has it been deleted?

A.—No, but the title has been changed, it is now called Emplastrum Sinapis, Charta Sinapis being a synonym.

GLYCEROGELATINA—GLYCEROGELATINS

Q.—What are Glycerogelatins?

A.—Soft masses of gelatin, water, glycerin and some medicinal substance, melting at body temperature to be applied externally.

Q.—Who introduced these preparations into medical practice?

A.—Dr. Unna.

Q.—In what particular field of medical practice are they used?

A.—Dermatology.

Q.—What official preparation forms the principal part of the vehicle?

A.—Glycerinated gelatin of the U. S. P.

Q.—What class of medical substances are suitable for glycerogelatins?

A.—Antiseptics, germicides, astringents.

Q.—Might tannic acid be applied in this form?

A.—No, for tannic acid forms an insoluble compound with gelatin, hence they are said to be incompatible.

Q.—What are the advantages of these preparations?

A.—They give prolonged application of the medicinal substance to the affected part without the discomfort of a bandage and then may be readily removed by washing with warm water.

Q.—How are they dispensed?

A.—In an ointment jar or a wide-mouthed bottle.

Q.—How are they applied?

A.—The container is placed in hot water until the mass melts, then it is applied with a camel's-hair pencil.

Q.—How many Glycerogelatins are official?

A.—Four.

Q.—Name them.
A.—Glycerogelatinum Acidi Salicylici.
Iodoformi.
Zinci Durum.
Zinci Molle.

Q.—What is there in **Glycerogelatinum Acidi Salicylici?**
A.—Glycerinated Gelatin 20%, Glycerin 35%, Distilled Water 35%, Salicylic Acid 10%.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is there in **Glycerogelatinum Iodoformi?**
A.—Glycerinated Gelatin 10%, Glycerin 15%, Distilled Water 65%, Iodoform 10%.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is there in **Glycerogelatinum Zinci Durum?**
A.—Glycerinated Gelatin 30%, Glycerin 25%, Distilled Water 35%, Zinc Oxide 10%.

Q.—What is it therapeutically?
A.—Slightly astringent.

Q.—What is the English name for this preparation?
A.—Firm Zinc Glycerogelatin.

Q.—What is the English name for **Glycerogelatinum Zinci Molle?**
A.—Soft Zinc Glycerogelatin.

Q.—What is there in it?
A.—Glycerinated Gelatin 20%, Glycerin 35%, Distilled Water 35%, Zinc Oxide 10%.

PASTÆ DERMATOLOGICÆ—DERMATOLOGIC PASTES

Q.—What are dermatologic pastes?
A.—Medicaments for external use, having an ointment-like consistence.

Q.—What is the meaning of dermatologic?
A.—For the skin or pertaining to the skin.

Q.—What classes of therapeutic agents are used in these preparations?
A.—Usually antiseptics or astringents.

Q.—What are some of the medicaments used?
A.—Starch, dextrin, zinc oxide, sulphur, calcium carbonate.

Q.—What are the vehicles used?
A.—Glycerin, soft soap, petrolatum and lard.

Q.—How many such pastes are official?
A.—Seven.

Q.—Name them.
A.—Pasta.
Betanaphtholis.
Dextrinata.
Resorcinolis Fortis.
Resorcinolis Mitis.
Zinci.
Zinci Mollis.
Zinci Sulphurata.

Q.—What is the synonym for **Betanaphthol Paste?**
A.—Lassar's Naphthol Paste.

Q.—What does it contain?
A.—Betanaphthol 10%, precipitated sulphur 50%, petrolatum and soft soap, each 20%.

Q.—What is it therapeutically?
A.—Antiseptic and germicide.

Q.—What is there in **Dextrinated Paste?**
A.—White Dextrin and Glycerin, each 33%, and water 34%.

Q.—What is the primary use of this paste?
A.—As a vehicle.

Q.—What advantage does it possess over other vehicles?
A.—It is not greasy and may be readily removed from the skin with a damp cloth.

Q.—What is the synonym for **Strong Resorcinol Paste?**
A.—Lassar's Stronger Resorcinol Paste.

Q.—What does it contain?
A.—Resorcinol, zinc oxide and starch, each 20%, light liquid petrolatum 40%.

Q.—In compounding this paste, what is of first importance?
A.—To have the resorcinol in a very fine powder.

Q.—What is this paste therapeutically?
A.—Antiseptic, slightly astringent.

Q.—What is the synonym for **Mild Resorcinol Paste?**
A.—Lassar's Mild Resorcinol Paste.

Q.—How does it compare with the Stronger Paste in formula?
A.—Contains only half as much resorcinol and ¼ more zinc oxide and starch.

Q.—What is the synonym for Zinc Paste?
A.—Lassar's Zinc Paste.

Q.—What does it contain?
A.—Salicylic acid 2%, zinc oxide and starch each 24%, petrolatum 50%.

Q.—What is the synonym for **Soft Zinc Paste?**
A.—Unna's Soft Zinc Paste.

Q.—What does it contain?
A.—Zinc oxide, precipitated calcium carbonate, linseed oil and lime water, each 25%.

Q.—How is this paste put together?
A.—The two solids are thoroughly triturated with the oil gradually added and when a perfectly smooth mixture is obtained, the lime water is incorporated.

Q.—Why is the linseed oil not first mixed with the lime water?
A.—It has been found by experiment that the lime water separates much more quickly when compounded in this manner.

Q.—What is the synonym for **Sulphurated Zinc Paste?**
A.—Unna's Sulphurated Zinc Paste.

Q.—What does it contain?
A.—Zinc oxide 15%, precipitated sulphur 10%, purified siliceous earth 5%, benzoinated lard 70%.

Q.—What is another name for Purified Siliceous Earth?
A.—Kaolin.

MULLÆ—MULLS

Q.—Define Mulls.
A.—Ointments of high fusing points spread on soft muslin.

Q.—What are the synonyms for Mulls?
A.—Salve mulls. Steatins.

Q.—Why are they called Mulls?
A.—From the name applied to the cloth used.

Q.—How are they prepared?
A.—Much after the manner of the spread plaster. A piece of parchment paper is moistened and spread on a table, excess moisture is removed and a piece of mull of the same size is carefully spread over it, both being held in place by thumb tacks. Melt the ointment and partially cool, then spread by means of a flat bristle brush. When sufficient is on, smooth with two elastic spatulas heated in hot water and wiped dry. Withdraw the mull from the paper and suspend in a cool room. When chilled cover with a paraffin paper and roll into a cylinder.

Q.—What vehicles are used in preparing Mulls?
A.—Suitable mixture of lard and suet with necessary additions of wax or lead plaster.

Q.—How many Mulls are official?
A.—Four.

Q.—Name them.
A.—Mulla:

Acidi Salicylici.
Creosoti Salicylata.
Hydrargyri Chloridi Corrosivi.
Zinci.

Q.—By what other name were the Mulls known in N. F. III?
A.—Unguenta Extensa.

Q.—What is there in the **Salicylic Acid Mull?**
A.—10% salicylic acid, 80% benz. suet, 10% benz. lard.

Q.—What is there in **Salicylated Creosote Mull?**
A.—Salicylic acid 10%, creosote 20%, yellow wax 5% and benz. suet 65%.

Q.—What is there in **Corrosive Mercuric Chloride Mull?**
A.—Corrosive sublimate 0.2%, alcohol 6%, benz. suet 90% benz. lard 5%.

Q.—What is the alcohol for?
A.—To dissolve the corrosive sublimate which facilitates its even distribution.

Q.—What is there in **Zinc Mull?**
A.—Zinc oxide 10%, benz. suet 70%, benz. lard 20%.

Q.—What directions are given regarding the dispensing of these Mulls?
A.—They are to be spread as needed.

STILI DILUBILES—PASTE PENCILS

Q.—Give the Latin title for Paste Pencils.
A.—Stili Dilubiles.

Q.—Give the synonym for these.
A.—Unna pencils.

Q.—What are they?
A.—Pencil shaped masses of medicinal substances for direct application to the skin.

Q.—What classes of medicinal substances are used?
A.—Generally antiseptics and astringents.

Q.—What is used to make the mass?
A.—Tragacanth, starch, white dextrin, sugar and water.

Q.—Name the official pencil.
A.—**Stili Acidi Salicylici Dilubiles.**

Q.—What is the size of these pencils?
A.—5 cm. long and 5 mm. in diameter.

Q.—What is their strength in salicylic acid?
A.—10%.

Q.—How are they stored?
A.—After drying they are wrapped in parchment paper.

Q.—In what class of practice are these used?
A.—In dermatology.

INUNCTA—INUNCTIONS

Q.—What are Inunctions?
A.—Ointment-like preparations of medicinal substances having hydrous wool fat as vehicle and applied with diligent rubbing.

Q.—How many are official?
A.—Two.

Q.—Name them.
A.—**Inunctum Mentholis** and **Inunctum Mentholis Compositum.**

Q.—What is there in **Inunctum Mentholis?**
A.—Menthol 5% and hydrous wool fat 95%.

Q.—What is there in **Inunct. Mentholis Compositum?**
A.—Menthol 5%, methyl salicylate 10%, hydrous wool fat 85%.

Q.—What "trade preparation" is like this?
A.—Balm Analgesic, Baumé.

Q.—How is it put together?
A.—Dissolve the menthol in the methyl salicylate, then rub it into the lanolin.

Q.—What particular use is made of this?
A.—Generally used as an application in neuralgia and in joint-pains of so-called rheumatism.

Q.—How should they be dispensed?
A.—Preferably in collapsible metal tubes.

ANIMAL DRUGS

Q.—Give the official definition for **Cantharis.**
A.—The dried beetles, Cantharis vesicatoria (Fam. Meloideæ, Order Coleoptera), yielding not less than 0.6% of cantharidin. Preserve Cantharides in tightly-closed containers adding a few drops of chloroform or carbon tetrachloride from time to time to prevent attacks by insects.

Q.—Give the synonyms.
A.—Spanish flies. Russian flies.

Q.—When are they unfit for use?
A.—When they have an ammoniacal odor.

Q.—What is the limit of moisture which they are allowed?
A.—10%.

Q.—What is the limit of ash?
A.—9%.

Q.—How is the cantharidin content ascertained?
A.—By an assay process which depends upon the extraction and isolation of cantharidin with a mixture of benzene and purified petroleum benzin, purification by crystallization from chloroform, then weighing the crystals.

Q.—What is cantharidin chemically?
A.—The anhydride or lactone of cantharidic acid.

Q.—What is the use of the drug?
A.—Principally as a vesicant, stimulant, aphrodisiac.

Q.—Is it poisonous?
A.—Yes.

Q.—What is the antidotal treatment?
A.—Empty the stomach: give demulcent drinks: give opium to relieve pain.

Q.—Name the official preparations.
A.—Ceratum: Collodium: Tincture: Emplastrum.

Q.—Give the official definition for **Coccus.**
A.—The dried female of the insect Coccus cacti (Fam. Coccidæ) enclosing the young larvæ.

Q.—What is the English name?
A.—Cochineal.

Q.—What is one test for adulteration?
A.—No insoluble powder should separate when cochineal is macerated in water.

Q.—What is cochineal used for?
A.—As a coloring agent.

Q.—To what principle is the coloring due?
A.—Carminic acid.

Q.—What is the name of the commercial article obtained from this source and used as a coloring agent?
A.—Carmine.

Q.—What effect does alkali have on the color?
A.—Changes it to purple.

Q.—What effect does acid have on the color?
A.—Changes it to reddish-yellow.

Q.—What is the limit of ash?
A.—6%.

Q.—What preparation is official?
A.—Liquor Cocci, 6.5%.

Q.—Give the official definition for **Fel Bovis.**
A.—The fresh bile of the ox, Bos taurus (Fam. Bovidœ).

Q.—What is the English title?
A.—Oxgall.

Q.—Is it given internally?
A.—No, the U. S. P. gives no dose.

Q.—Why is it official?
A.—For making the official Ext. Fellis Bovis.

Q.—What is it therapeutically?
A.—Digestive, cathartic.

Q.—Give the official definition for **Gelatinum.**
A.—The purified product obtained from animal tissues, as skin, ligaments, bones by treatment with boiling water.

Q.—In what different forms is it found in commerce?
A.—Sheets, flakes, ground, powdered and shredded.

Q.—How does it act with water?
A.—It is insoluble in cold water but absorbs from 5 to 10 times its weight. Soluble in hot water.

Q.—What are other solvents for it?
A.—Acetic acid and glycerin.

Q.—How does it react in solution with Tannic Acid?
A.—It is rendered turbid even in a dilution of 1 in 5000.

Q.—How much in solution is necessary to form a jelly on cooling?
A.—2.5% solution will form a stiff jelly at 6° C.

Q.—What preservative is sometimes found in it?
A.—Sulphur dioxide.

Q.—How is this detected and estimated?
A.—Oxidized and precipitated as $BaSO_4$ and weighed.

Q.—Where is there a chance for error in this method?
A.—Sulphate may be present in the N/10 Iodine V. S. used.

Q.—What is the official preparation?
A.—Gelatinum Glycerinatum. 50%.

Q.—What use is made of this preparation?
A.—Vehicle for suppositories and glycerogelatins.

Q.—If gelatin is used for making capsules, what amount of SO_2 is permitted?
A.—Not more than 0.15 per cent.

Q.—What therapeutic use is made of it?
A.—May be used in solution to control hemorrhage, hypodermically, internally or directly to capillaries.

Q.—Give the official definition for **Moschus.**
A.—The dried secretion from the preputial follicles of Moschus moschiferus (Fam. Moschidæ). Preserve it carefully in glass-stoppered bottles.

Q.—How much of it must dissolve in water?
A.—50%.

Q.—How much of it must dissolve in alcohol?
A.—10%.

Q.—What is the limit of ash?
A.—8%.

Q.—Is it soluble in chloroform?
A.—No.

Q.—What is used to adulterate it?
A.—Starch.

Q.—How is this detected?
A.—Add a drop of Iodine T. S. and examine under a microscope where a blue color will show if this is present.

Q.—What is it therapeutically?
A.—Stimulant in convalescent pneumonia patients.

Q.—What is the dose?
A.—0.250 Gm.

Q.—What preparation official?
A.—Tinctura Moschi, 5%.

Q.—Give the official definition for **Pepsinum.**
A.—A mixture containing a proteolytic ferment or enzyme, obtained from the glandular layer of the fresh stomach of the

hog (Sus scrofa, Fam. Suidæ). It digests not less than 3000 times its own weight of freshly coagulated and disintegrated egg albumen. Pepsin of a higher digestive powder may be brought to this standard by admixture with pepsin of a lower digestive strength or with sugar of milk. Preserve it in well-closed containers.

Q.—What is its solubility?
A.—50 parts of water, but the solution is slightly opalescent.

Q.—How does a solution of pepsin react with litmus?
A.—Acid.

Q.—Under what conditions is pepsin most active?
A.—When in slightly acid medium.

Q.—Can the medium be too acid?
A.—More than 0.5% of hydrochloric acid renders it inert.

Q.—What are some of its incompatibilities?
A.—Alkalies, alkali earths, alkali carbonates, tannic and gallic acids and salts of many of the heavy metals.

Q.—What effect does heat have on pepsin?
A.—If in solution a temperature above 70° C. destroys it. If the pepsin is dry it may be heated to 100° C. without losing its digestive power.

Q.—What is the dose of pepsin?
A.—0.5 Gm.

Q.—Are there any U. S. P. preparations of pepsin?
A.—No.

Q.—What N. F. pepsin preparation is used externally?
A.—Liquor pepsini antisepticus.

Q.—Give the official definition for **Pancreatinum.**
A.—It contains enzymes consisting principally of amylopsin, trypsin, and steapsin, found in the pancreas of warm-blooded animals, and obtained from the fresh pancreas of the hog or of the ox. It converts not less than 25 times its own weight of starch into soluble carbohydrates. Pancreatin of a higher digestive power may be brought to this standard by admixture with sugar of milk. Preserve it in well-closed containers.

Q.—What is the pancreas commonly called?
A.—Sweet-breads.

Q.—Is pancreatin soluble in water?
A.—Only partially.

Q.—Is it soluble in alcohol?
A.—No.

Q.—What are the soluble carbohydrates formed by the action of pancreatin?
A.—Dextrins, sugars and proteoses.

Q.—Under what conditions is pancreatin most active?
A.—In neutral or faintly alkaline medium.

Q.—What effect does acid have on pancreatin?
A.—Renders it inactive.

Q.—How will large quantities of alkaline hydroxide affect it?
A.—Render it inactive.

Q.—What alkali is commonly used in connection with pancreatin and its preparations?
A.—Sodium bicarbonate.

Q.—What impurity is likely to be found in pancreatin?
A.—Fat.

Q.—What is the limit of fat permitted?
A.—3%.

Q.—What starch is used in the assay of pancreatin?
A.—Potato starch.

Q.—How is unconverted starch detected in this assay?
A.—By the use of N/10 Iodine V. S.

Q.—What is the dose of pancreatin?
A.—0.5 Gm.

Q.—Name the official preparations.
A.—Liquor Pancreatini, 1.75% N. F., Pulvis Pancreatini Compositus, 20% N. F.

Q.—Give the official definition for **Renninum.**
A.—The partially purified milk-curdling enzyme obtained from the glandular layer of the stomach of the calf, Bos taurus, and capable of coagulating not less than 25,000 times its weight of fresh milk. Rennin of a higher coagulating power may be brought to the standard by admixture with sodium chloride and sugar of milk. Rennin deteriorates rapidly and must be kept

in well-stoppered, amber-colored bottles and stored in a cool place.

Q.—What can you say of the solubility of Rennin?
A.—It is slowly soluble in water and dilute alcohol.

Q.—Into what official preparation does this enter?
A.—Elixir Pepsini et Rennini Compositum, N. F.

Q.—What is a synonym for this preparation?
A.—Essence of pepsin.

Q.—Give the official definition for **Lac Vaccinum.**
A.—The fresh milk of the domestic cow, Bos taurus, without modification and complying with the legal standards of the State or community in which it is sold.

Q.—Into what preparation does it enter?
A.—**Lac Fermentatum.**

Q.—What is the synonym for this preparation?
A.—Kumyss.

Q.—Give the English name for **Ovum Gallinaceum.**
A.—Fresh egg.

Q.—Give the official definition for Ovum Gallinaceum.
A.—The recently laid egg of the hen, Gallus domesticus (Fam. Phasianidæ).

Q.—In what assay process is Ovum Gallinaceum used?
A.—In the assay of pepsin.

Q.—Give the English for **Ovi Albumen Recens.**
A.—Fresh egg albumen.

Q.—Give the official definition.
A.—The freshly separated liquid white or albumen of the recently laid eggs of the hen, Gallus domesticus.

Q.—Give the English for **Ovi Vitellum Recens.**
A.—Fresh egg yolk.

Q.—Give the official definition.
A.—The freshly separated yolk of recently laid eggs of the hen, Gallus domesticus.

Q.—What preparation of Egg Yolk is official?
A.—Glycerite of Egg Yolk, 45%.

Q.—Into what preparations does **Egg Albumen** enter?
A.—Liquor Ferri Albuminati, Liquor Ferri Peptonati, Liquor Ferri Peptonati et Mangani.

Q.—What is the difference between an Albuminate and a Peptonate?
A.—The albuminate is combined directly with the metal without modification, while in the peptonate, the albumen is acted upon by pepsin to convert it to peptone.

Q.—What use is made of Glyceritum Vitelli?
A.—It is used as an emulsifying agent.

Q.—Give the Latin title for **Extract of Beef.**
A.—Extractum Carnis.

Q.—Give the official definition.
A.—The residue obtained from fresh beef broth by evaporating at a low temperature.

Q.—What percentage of solids must it contain?
A.—Not less than 75%.

Q.—Is it water soluble?
A.—Yes, dissolves in about 10 parts of water.

Q.—Into what preparations does the extract enter?
A.—Vinum Carnis, Vinum Ferri et Carnis.

Q.—What mineral salt does it contain?
A.—Sodium chloride.

ANIMAL DERIVATIVES

Q.—What is the synonym for **Hypophysis Sicca?**
A.—Desiccated Pituitary Body.

Q.—Give the official definition.
A.—The posterior lobe obtained from the pituitary body of cattle, cleaned, dried and powdered.

Q.—Is it water soluble?
A.—Only partially so.

Q.—What is it therapeutically?
A.—Stimulant to involuntary muscle.

Q.—What is the dose?
A.—0.03 Gm.

Q.—Where is the pituitary body located?
A.—At the base of the brain.

Q.—Is the whole of the body active?
A.—No, only the posterior lobe is thought to be.

Q.—What preparation of it is official?
A.—Liquor Hypophysis.

Q.—What are some of the "trade" names for this preparation?
A.—Pituitrin. Hypophysin. Infundibulin.

Q.—Give the English name for **Suprarenalum Siccum.**
A.—Dried Suprarenals.

Q.—Give the official definition.
A.—The suprarenal glands of animals which are used as food by man, cleaned, dried, freed from fat and powdered and containing not less than 0.4% nor more than 0.6% of epinephrine, the active principle of the suprarenal gland. One part of the Dried Suprarenals represents approximately 6 parts of the fresh glands, freed from fat. If assayed biologically one Gm. of the Dried Suprarenals contains the equivalent of 0.010 of lævo-methylamino-ethanol-catechol.

Q.—How much moisture may the Dried Glands contain?
A.—7%.

Q.—By what other name is the active principle known?
A.—Adrenaline, suprarennin, adrin.

Q.—Who is responsible for these several names?
A.—The different manufacturing houses which put out this active principle, each one adopting a name to distinguish his product from the others.

Q.—What two methods of assay are official?
A.—A colorimetric and a biological process.

Q.—What reagents are used in the colorimetric assay?
A.—Cobaltous chloride T. S. and diluted gold chloride T. S. are used to form the color standard.

Q.—What is done with the suprarenals to prepare them for comparison?
A.—1 cg. is mixed with about 5 mg. of finely powdered MnO_2 and 10 mils of distilled water. They are well shaken for an

hour then filtered and the filtrate is taken for comparison with the standard solution.

Q.—What quantities of the reagents are mixed to give a standard color corresponding to 0.6% epinephrine?

A.—4.05 mils cobaltous chloride T. S., 1.35 mils diluted gold chloride T. S. mixed with 4.6 mils of distilled water.

Q.—Must the standard color solution be made fresh for every assay?

A.—No, they keep unchanged in sealed glass tubes.

Q.—What are the glands therapeutically?

A.—Vasoconstrictor.

Q.—What are the essentials of the biological assay?

A.—The rise in the blood pressure of a dog injected with a solution of a definite quantity of the glands is compared with the rise caused by the injection of a solution of a definite quantity of lævo-methylamino-ethanol-catechol.

Q.—How is the standard solution prepared?

A.—A first solution is made by dissolving 1 part of the lævo-methylamino-ethanol-catechol in sufficient water to make 1000, using sufficient dilute hydrochloric acid. Then from this 1 part is taken to make a second solution having a strength of 1 to 100000, by mixing it with 99 parts of physiological normal salt solution.

Q.—Must this solution be freshly prepared?

A.—Yes, for each assay.

Q.—Where is the solution injected?

A.—Into the femoral vein.

Q.—Where are the suprarenal glands located?

A.—One above each kidney.

Q.—What is the dose of the dried glands?

A.—0.250 Gm.

Q.—Give the Latin title for **Dried Thyroids.**

A.—Thyroideum Siccum.

Q.—Give the official definition.

A.—The thyroid glands of animals which are used for food by man, freed from connective tissue and fat, dried, powdered and containing not less than 0.17% nor more than 0.23% of

iodine in thyroid combination. One part of the dried gland corresponds to approximately 5 parts of the fresh glands.

Q.—Describe the official substance.

A.—A yellowish amorphous powder having a characteristic slight odor.

Q.—How much moisture may it contain?

A.—Not more than 6%.

Q.—What is the ash yield?

A.—Not to exceed 5%.

Q.—May iodine in any form be added to the official substance?

A.—No, iodine present in any other form than thyroid combination is evidence of adulteration.

Q.—What is it therapeutically?

A.—Alterative in myxedema, cretinism, goiter, obesity.

Q.—What is meant by myxedema?

A.—A general swelling, especially of the hands and face, from the presence of a mucous fluid in the subcutaneous tissues.

Q.—What is meant by cretinism?

A.—Idiocy with stunted growth and frequently with goiter and deformity.

Q.—What is the dose?

A.—0.1 Gm.

BIOLOGICAL PRODUCTS

Q.—What is the synonym for **Serum Antidiphthericum?**

A.—Diphtheria antitoxin.

Q.—Give the official definition.

A.—A fluid having a potency of not less than 250 antitoxic units per mil, separated from the coagulated blood of the horse, Equus Caballus, or other large domestic animal, which has been properly immunized against diphtheria toxin. It must be kept in sealed glass containers in a dark place at a temperature between 4.5° C. and 15° C.

Q.—Describe it.

A.—A yellowish or yellowish-brown transparent or slightly turbid liquid with sometimes a slight granular deposit; nearly odorless, or having the odor of an antiseptic used as a preservative.

Q.—Is the serum stable?
A.—No, it gradually loses its potency.

Q.—How much does it deteriorate in a year?
A.—From 10% to 30%.

Q.—What preservative is permitted in the serum?
A.—Phenol or cresol.

Q.—How much is permitted?
A.—Not to exceed 0.5%.

Q.—What is the limit of total solids?
A.—20%.

Q.—May antitoxin having less than 250 units per mil be sold?
A.—No.

Q.—May any one who wishes make the serum?
A.—No, only those licensed by the United States.

Q.—What department of the government issues licenses?
A.—The Treasury Department.

Q.—What does the law require the label to show?
A.—In addition to the name of the serum, the name, address and license number of the manufacturer and the date beyond which the product may not be expected to yield its specific results. Also the laboratory number of the serum and the total number of antitoxic units claimed for the contents of the container.

Q.—Who established the standard for the antitoxin unit?
A.—The United States Public Health Service.

Q.—What is the dose of the serum?
A.—10000 units hypodermic; protective 1500 units.

Q.—What is the value of the antitoxic unit?
A.—It is the amount of antitoxin which will protect a 250 Gm. guinea-pig from death for 4 days after it has been injected with 101 minimum lethal doses of diphtheria toxin.

Q.—How soon after injection does the serum show its maximum effects?
A.—About 24 hours.

Q.—Do any bad results show after injection?
A.—Yes, frequently.

Q.—Are they in any way dangerous?
A.—Very seldom.

Q.—What are these untoward symptoms?
A.—The most common is a rash. Also pain with swelling in the joints.

Q.—Does death ever occur from the injection?
A.—A few early deaths after injection have been reported due generally to the development of Bright's disease.

Q.—What is the name of the bacillus which causes diphtheria?
A.—The Klebs-Loeffler bacillus.

Q.—At what point is the injection made?
A.—Generally between the shoulders.

Q.—Why is this point selected?
A.—Because of the large amount of tissue, and the shoulder blades protect the wound made by the needle.

Q.—How is the part treated?
A.—Sterilized in the usual way and after the injection the wound is covered with collodion.

Q.—Is there any advantage in giving the serum early?
A.—Yes, if 1000 units are given directly after exposure the disease rarely develops.

Q.—Give the synonyms for **Serum Antidiphthericum Purificatum.**
A.—Antidiphtheric globulins. Concentrated Diphtheria Antitoxins. Diphtheric Antitoxin Globulins. Refined and Concentrated Diphtheria Antitoxin.

Q.—Give the official definition.
A.—A solution in physiological solution of sodium chloride of certain antitoxic substances obtained from the blood serum or plasma of the horse, or other large domestic animal, which has been properly immunized against diphtheria toxin. After the serum or plasma from the immunized animal has been collected the antitoxin-bearing globulins are separated from the other constituents of the serum or plasma and dissolved in water; and sufficient sodium chloride added to make a solution containing from 0.6% to 0.9% of the salt. It has a potency of not less than 250 antitoxic units per mil. It must be kept in sealed glass containers at temperature between 4.5° and 15° C.

Q.—How are the globulins separated from the plasma?
A.—By precipitating with ammonium sulphate.

Q.—How is the salt then separated from the globulins?
A.—By dialysis.

Q.—What is the Latin title for **Dried Diphtheria Antitoxin**?
A.—Serum Antidiphthericum Siccum.

Q.—How is it obtained?
A.—From either the Antidiphtheric Serum or the Purified Antidiphtheric Serum by evaporating in a vacuum over sulphuric acid or other desiccating agent or by passing over it a current of warm air freed from bacteria.

Q.—What is its potency?
A.—It has a potency of not less than 4000 units per Gm.

Q.—How must it be stored?
A.—In hermetically sealed, amber-glass containers free from air at a temperature between 4.5° and 15° C. preferably in a dark place.

Q.—Is it water-soluble?
A.—Yes, it dissolves in 9 parts of water but the solution is opalescent and slightly viscous.

Q.—How is it administered?
A.—It is dissolved in freshly boiled, distilled water which has been cooled.

Q.—Can this solution be kept for any time?
A.—No, it must be used immediately and any remaining solution must be discarded.

Q.—What is the advantage of this form of Serum?
A.—If kept as directed, it does not lose its potency as does the liquid serum.

Q.—What is the common name for Tetanus?
A.—Lock-jaw.

Q.—Give the Latin title for **Tetanus Antitoxin.**
A.—Serum Antitetanicum.

Q.—Give the official definition.
A.—A fluid having a potency of not less than 100 units per mil, separated from the coagulated blood of the horse or other

large domestic animal which has been properly immunized against tetanus toxin. It must be kept in sealed glass containers in a dark place.

Q.—What other forms of Tetanus Antitoxin are there?
A.—Two, the purified and the dried.

Q.—How does the preparation of these differ from the preparation of the similar forms of Diphtheria Antitoxin?
A.—In no way, the method is the same.

Q.—How many antitoxin units per mil must the **Purified Serum** contain?
A.—100 or more.

Q.—How many antitoxin units per Gm. must the **Dried Serum** have?
A.—Not less than 1000.

Q.—Who provides the standard for the antitoxin unit?
A.—The United States Public Health Service.

Q.—What is the unit?
A.—Ten times the quantity of antitoxin which will protect a 350 Gm. guinea-pig from death for 96 hours which has been injected with 100 minimum lethal doses of tetanus toxin.

Q.—Will the antitoxin cure lock-jaw?
A.—It is said to in some cases, but it is most valuable as a prophylactic and should be given at the time the wound is dressed and not wait for symptoms to develop.

Q.—What is the dose?
A.—10000 units hypodermic. Protective 1500 units.

Q.—Where is the serum injected?
A.—Into the outer membrane of the brain or into the spinal cavity.

Q.—How should the wound itself be treated?
A.—Thoroughly cleansed by irrigation with sterile saline solution, then the dried serum applied.

Q.—When is the dried serum preferable?
A.—When it must be kept for some time.

Q.—Give the official definition for **Virus Vaccinicum.**
A.—The pustules of vaccinia or cow-pox from healthy vaccinated animals of the bovine species, removed and prepared

under aseptic conditions. The vaccine pulp should be thoroughly rubbed up in a mortar or passed through a special grinder, strained to remove coarse particles and made into a smooth emulsion with a glycerin solution. Vaccine virus gradually loses its potency, the loss being more rapid at high than low temperatures. Preserve it at a temperature between 4.5 and 15° C.

Q.—Who is permitted to make Vaccine Virus?
A.—Only those licensed by the United States Government.

Q.—What animals are generally used for the production of Vaccine Virus?
A.—Heifers, from one to three years old.

Q.—Are they used more than once?
A.—No, they are usually killed and burned directly after the virus has been removed.

Q.—What care must be given to those animals used?
A.—They must have a daily veterinary examination.

Q.—What examination must be made of each lot of Virus?
A.—Examined to see that no other pathogenic micro-organisms are present.

Q.—What special examination must be made?
A.—For the presence of tetanus spores or toxin.

Q.—How does the Virus act to prevent small-pox?
A.—It gives the individual cow-pox which is a very mild form of small-pox and this makes him immune to genuine small-pox.

Q.—Is it always effective?
A.—Yes.

Q.—How young may one be and vaccination safe?
A.—In England children are vaccinated at the age of four months and one week. Here vaccination is recommended during the child's first year.

Q.—Is revaccination necessary?
A.—First at the age of one year, then again at school age, then again at 18 years will generally render one immune for life.

Q.—Will vaccination cure small-pox after it is contracted?
A.—It will not cure it but many cases have been helped, that is, made less severe.

Q.—How is vaccination best performed?

A.—By scarification with a fine needle which has been sterilized in a flame.

Q.—Where should the vaccination be done?

A.—At the insertion of the deltoid muscle, that is between the elbow and shoulder in males, and the upper and outer portion of the leg in females.

Q.—How should the skin be prepared?

A.—Thoroughly washed with soap and water with considerable friction to remove any epidermis which is infected with bacteria.

Q.—Could a solution of mercuric chloride be used?

A.—Yes, but this solution must then be most thoroughly removed by the use of hot water, else it will destroy the activity of the vaccine.

Q.—What should be the extent of the scarification?

A.—Three or more scratches 3 mm. ($\frac{1}{8}$ in.) apart and 8 mm. ($\frac{1}{3}$ in.) long.

Q.—How deep should they be?

A.—Just through the epidermis, no blood should be drawn.

Q.—Is it necessary to dress the wound?

A.—No.

Q.—What is the cause of most of the reported bad effects from vaccination?

A.—Infection from some other source, many times when the ignorant individual attempts to dress the wound.

Q.—What may be done to relieve local irritation?

A.—Cover with sterile zinc-oxide.

Q.—What may be done to relieve excessive itching or burning?

A.—Wash with a solution of phenol 1:125.

Q.—Point out the striking differences between sera and vaccines.

A.—Sera are prophylactic and curative, that is they will prevent the disease and cure it after it has been acquired. Vaccines give the disease in a mild form and those so treated are then immune against the disease in a more virulent form.

CELLULOSE AND ITS DERIVATIVES

Q.—What is the most abundant constituent in plants?
A.—Cellulose.

Q.—What is the Latin title for the official Cellulose?
A.—**Gossypium Purificatum.**

Q.—Give the official definition.
A.—The hairs of the seed of one or more of the cultivated varieties of Gossypium herbaceum, freed from adhering impurities and linters and deprived of fatty matter.

Q.—Aside from removing impurities what is the reason for purifying the cotton?
A.—To make absorbent.

Q.—Why is it not naturally absorbent?
A.—Because it is naturally covered with more or less fixed oil which prevents liquid from entering the lumen or cell of the cotton.

Q.—Aside from the color what is one striking difference between cotton and purified cotton?
A.—Raw cotton when thrown on water will float while the purified cotton will sink.

Q.—How is it purified?
A.—First treated with a weak alkaline solution which converts the fixed oil to soap, this is washed out then treated with a chlorine mixture to bleach it, then with a dilute solution of hydrochloric acid, then washed with clean water.

Q.—What can you say of the solubility of Purified Cotton?
A.—Insoluble in all common solvents; will dissolve in Schweitzer's reagent, ammonia solution of cupric oxide.

Q.—What are the tests of proper purification?
A.—When the cotton is compressed in the hand then thrown on the water it quickly sinks; on incineration it yields not more than 0.2% of ash; water which has been in contact with the cotton shows neither acid nor alkaline reaction; extracted with ether it yields not more than 0.6% of fatty matter.

Q.—How are the medicated cottons made?
A.—By treating purified cotton with the medicinal agents dissolved in or mixed with glycerin.

Q.—What N. F. preparation of Purified Cotton is official?
A.—**Gossypium Stypticum.**

Q.—What is used in preparing this?
A.—Purified cotton, solution of ferric chloride, glycerin and water.

Q.—How should it be stored?
A.—In well closed containers of glass protected from the light.

Q.—How is the ordinary parchment paper prepared?
A.—Unsized paper is dipped for a very short time in a dilute solution of sulphuric acid, then washed in water and dilute ammonia water.

Q.—Why must care be taken not to have it in the acid too long?
A.—The cellulose will be converted to glucose.

Q.—What action does the acid have on the cellulose?
A.—It converts the cellulose to amyloid.

Q.—What is nitrocellulose?
A.—It is a compound formed by reaction between purified cotton and nitric acid in the presence of sulphuric acid.

Q.—What is the chemical name for it?
A.—Cellulose nitrate.

Q.—Is there more than one kind?
A.—Yes, some five or six, depending on the number of NO_2 radicles replacing (OH) radicles.

Q.—What is the function of the Sulphuric acid?
A.—It is a catalytic agent and does not enter into the reaction at all.

Q.—By what other name is nitrocellulose known?
A.—Gun cotton.

Q.—Which is the most explosive?
A.—The hexanitrocellulose.

Q.—Which kind is used in pharmacy?
A.—The tetranitrocellulose.

Q.—Why is this form selected?
A.—Because it is less explosive and the most soluble.

Q.—What is the official Latin title for it?
A.—**Pyroxylin.**

Q.—What is the synonym?
A.—Soluble gun-cotton.

Q.—Is it water-soluble?
A.—No.

Q.—What dissolves it?
A.—25 parts of a mixture of 3 volumes of ether and 1 volume of alcohol; acetone; glacial acetic acid.

Q.—Give the official definition for Pyroxyllinum.
A.—A product obtained by the action of a mixture of nitric and sulphuric acids on cotton and consisting chiefly of cellulose tetranitrate ($C_{12}H_{16}(ONO_2)_4O_6$). Preserve it in cartons, packed loosely and protected from light and fire.

Q.—What happens if it is kept in bottles?
A.—It is decomposed into nitrous vapors and carbon.

Q.—What class of official preparations is made from pyroxylin?
A.—Collodions.

Q.—What commercial product is made from pyroxylin?
A.—Celluloid.

Q.—What else is there in it?
A.—Camphor and castor oil.

Q.—Why is it dangerous?
A.—Because it is so inflammable.

PRODUCTS OF THE DESTRUCTIVE DISTILLATION OF WOOD

Q.—What name is applied to the crude liquid resulting from the destructive distillation of wood?
A.—Pyroligneous acid. Crude wood vinegar.

Q.—Is it official?
A.—No.

Q.—Is it ever used as such?
A.—Yes, it has some use in veterinary medicine.

Q.—What is the first liquid to come over in the fractional distillation of pyroligneous acid?

A.—**Acetonum.**

Q.—Give the official definition.

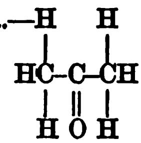
A.—A liquid containing not less than 99% by weight of C_2H_6O or $CH_3.CO.CH_3$. Preserve it in well-closed containers in a cool place, remote from fire.

Q.—What is the synonym and chemical name?

A.—Dimethyl ketone.

Q.—What is its structural formula?

A.—



Q.—In what other way may it be produced?

A.—By the destructive distillation of Acetates.

Q.—Describe it.

A.—A transparent, colorless, volatile, mobile liquid of a characteristic ethereal odor and a pungent sweetish taste.

Q.—What is its Sp. Gr.?

A.—0.79.

Q.—What is its boiling point?

A.—56 to 58° C.

Q.—What can you say of its solubility?

A.—Miscible with water, alcohol, ether, chloroform, and with most volatile oils.

Q.—What use is made of it in pharmacy?

A.—It is a good solvent.

Q.—What is its greatest commercial use?

A.—Probably in the preparation of chloroform.

Q.—Is it ever used internally?

A.—No, the U. S. P. gives no dose for it.

Q.—Is it inflammable?

A.—Yes.

Q.—By what other names is **Wood Alcohol** known?

A.—Wood spirit, wood naphtha, methyl hydroxide, methanol, carbinol.

Q.—How is it separated from acetone?
A.—Generally by the addition of $CaCl_2$ which takes up 4 molecules of alcohol of crystallization.

Q.—Is it official?
A.—No.

Q.—Is it much used?
A.—Yes, as a fuel.

Q.—Is it poisonous?
A.—Yes quite so, it is never sold without the poison label.

Q.—Is there any place in pharmacy where it may be used in the place of ethyl alcohol?
A.—Absolutely none.

Q.—What is one of the most common effects of the use of wood alcohol in small quantities?
A.—Blindness.

Q.—What is Columbian Spirit?
A.—Purified wood alcohol.

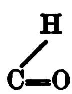
Q.—What is methylated spirit?
A.—A mixture of alcohol with 25% of wood alcohol used in England in the arts and industries being free from Internal Revenue tax.

Q.—What quite common use is made of it aside from fuel?
A.—Its vapors are passed over hot copper oxide which oxidizes it to formaldehyde, used as a disinfectant.

Q.—Is **Formaldehyde** official?
A.—No, not in the substance.

Q.—How is it official?
A.—As a 37% solution in water.

Q.—To what class of chemical substances does Formaldehyde belong?

A.—To the aldehydes. 

Q.—What is the origin of the word "aldehyde"?
A.—Alcohol dehydrogenated.

Q.—What kind of alcohols yield aldehydes?
A.—Primary alcohols.

Q.—What is the solution of formaldehyde used for?
A.—Disinfectant.

Q.—Give the chemical name and synonym for **Hexamethylenamina?**
A.—Hexamethylenetetramine.

Q.—How is it made?
A.—Reaction between Formaldehyde and Ammonia water.

Q.—Give the official definition.
A.—A condensation product of ammonia and formaldehyde, hexamethylene-tetramine ($(CH_2)_6N_4$). Preserve in well-closed containers.

Q.—Describe it.
A.—It occurs in colorless, lustrous, odorless crystals or a white crystalline powder.

Q.—What can you say of its solubility?
A.—1.5 parts of water, 12.5 alcohol, 320 ether.

Q.—What is it therapeutically?
A.—Urinary antiseptic and germicide.

Q.—How does it act?
A.—Splits up into formaldehyde and ammonia.

Q.—Is it effective in alkaline solution?
A.—No.

Q.—In what form is it found in the market?
A.—In powder and tablets.

Q.—Under what trade names is it marketed?
A.—Urotropin, cystogen, formin, uritone, amnioform.

Q.—What is the dose?
A.—0.250 Gm.

Q.—How many forms of Acetic Acid are official?
A.—Three.

Q.—Name them.
A.—Acidum Aceticum, Acidum Aceticum Dilutum, Acidum Aceticum Glaciale.

Q.—Give the official definition for **Acidum Aceticum.**
A.—An aqueous solution containing not less than 36% nor more than 37% of $C_2H_4O_2$ or CH_3COOH.

Q.—Is the percentage by weight or volume?

A.—By weight.

Q.—How is acetic acid produced?

A.—By the destructive distillation of wood or by the oxidation of dilute solutions of ethyl alcohol.

Q.—Describe the "quick vinegar" process.

A.—A keg with a number of holes in the sides is filled with hard-wood shavings, preferably oak, these are wetted with "mother of vinegar". Then a dilute solution (5% to 7%) of ethyl alcohol is allowed to trickle down through the shavings, the oxygen of the air and the "mother of vinegar" oxidizing the alcohol to acetic acid.

Q.—What is the name of the ferment which causes acetic fermentation?

A.—Mycodermi aceti.

Q.—Describe Acetic Acid.

A.—It is a clear, colorless liquid having a strong, characteristic vinegar-like odor, a sharp acid taste and a strongly acid reaction.

Q.—How would you test it for the presence of Sulphuric acid?

A.—Dilute the acid with distilled water 1:10 and add a few drops of barium chloride T. S., no turbidity should appear.

Q.—What pharmaceutical use is made of this acid?

A.—Used to prepare Acidum Aceticum Dilutum.

Q.—Define **Acidum Aceticum Dilutum.**

A.—An aqueous solution containing not less than 5.7% nor more than 6.3% of CH_3COOH.

Q.—How is it prepared?

A.—By mixing 120 Gm. Acetic Acid and 610 Gm. Distilled Water.

Q.—What pharmaceutical use is made of Diluted Acetic Acid?

A.—To prepare the official vinegars, to prepare Liq. Ammonii Acetatis, to prepare Syr. Allii.

Q.—Give the official definition for **Acidum Aceticum Glaciale.**

A.—A liquid containing not less than 99% of CH_3COOH. Preserve in glass-stoppered bottles.

Q.—Why are we directed to store this and not the others in glass-stoppered bottles?

A.—It is quite hygroscopic and might take up sufficient water to reduce its strength.

Q.—What is meant by the word "glacial"?

A.—Resembling ice.

Q.—Why is this acid so-called?

A.—Because at a temperature below 15° C. the acid congeals.

Q.—Is specific gravity a criterion of the strength of acetic acid?

A.—It is not, as it is known that 99% and 43% acid have practically the same sp. gr.

Q.—How does the U. S. P. direct that the strength be shown?

A.—By titration with N/1 KOH V. S.

Q.—What is meant by No. 8 as applied to Acetic Acid?

A.—A commercial form of acid formerly supplied by the wholesale houses when Acetic Acid was ordered. It contains about 28% of Acetic Acid and is called No. 8 because it was formerly used in the proportion of 1:8 to make dilute acid.

Q.—Give the official definition for **Acidum Formicum.**

A.—An aqueous solution containing not less than 24% nor more than 26% of HCOOH.

Q.—How is this acid made?

A.—Usually by reaction between heated glycerin and oxalic acid in the presence of water.

Q.—Is it stronger or weaker acid than Acetic Acid?

A.—Stronger.

Q.—Where are traces of Formic Acid commonly found?

A.—In red ants, stinging nettles, bee stings.

Q.—Into what official preparations does it enter?

A.—Elixir Formatum, Elixir Formatum Compositum, Spiritus Formici.

Q.—What is the dose of the acid?

A.—0.3 mil.

Q.—What is the English title for **Pix Liquidæ?**

A.—Tar.

Q.—What is its source?
A.—Pine trees.

Q.—What other kind of tar is official?
A.—Coal tar.

Q.—Give the official definition for Pix Liquidæ.
A.—A product obtained by the destructive distillation of the wood of Pinus palustris or other species of Pinus.

Q.—What is the synonym?
A.—Pine tar, Wood tar.

Q.—Give its therapeutic properties.
A.—Stimulant, antiseptic, expectorant.

Q.—Name its official preparations.
A.—Syrupus Picis Liquidæ, 0.5%, Ungt. 50%, Liquor 25%, Vinum 10%.

Q.—Give the official definition for **Creosotum.**
A.—A mixture of phenols and phenol derivatives, chiefly guaiacol and creosol, obtained during the distillation of wood-tar. Preserve it in tightly-stoppered, dark, amber-colored bottles.

Q.—Describe it.
A.—Almost colorless or yellowish, highly refractive, oily liquid, having a penetrating, smoky odor and a burning, caustic taste; it does not readily become brown on exposure to light.

Q.—What can you say of its solubility?
A.—Slightly soluble in water, about 1:120, miscible with alcohol, ether, alcohol, fixed and volatile oil.

Q.—What is its Sp. Gr.?
A.—1.073.

Q.—Is it inflammable?
A.—Yes, burns with a luminous sutty flame.

Q.—How does it react with $FeCl_3$ T. S.?
A.—When added to a saturated solution of Creosote, it first shows a violet-blue color which is very transient, it then clouds almost instantly, the color passing to grayish-green, then to muddy brown, and finally a brownish precipitate forms.

Q.—How does it react with Collodium?
A.—When mixed in a dry test tube no permanent coagulum forms, (different from phenol).

Q.—Give another difference from **Phenol.**
A.—Mix 4 mils of Creosote and 4 mils of Glycerin, this forms a clear solution, now add 1 mil of water and all of the creosote will separate.

Q.—What are the therapeutic properties of Creosote?
A.—Antiseptic, local analgesic, stimulating expectorant.

Q.—In what particular trouble is it used?
A.—Applied on cotton to relieve tooth-ache and given internally in pulmonary tuberculosis for its antiseptic and stimulant effects.

Q.—What is the dose?
A.—0.25 mil.

Q.—How much may be given during the course of 24 hours?
A.—As much as 50 minims.

Q.—How is it administered?
A.—In enteric pills; in emulsion with codliver oil; with syrup of wild-cherry; with whiskey and glycerin.

Q.—Name its official preparations.
A.—Aqua Creosoti, 1%, Mulla Creosoti-Salicylata 20%, Petroxolinum 20%.

Q.—Give the official definition for **Creosote Carbonate.**
A.—A mixture of the carbonates of the various constituents of creosote, chiefly guaiacol and creosol.

Q.—What is a common name for it?
A.—Creosotal.

Q.—How is it prepared?
A.—Action of $COCl_2$ on phenol-sodium compounds of Creosote.

Q.—Describe the substance.
A.—It is a clear, colorless or yellowish viscid liquid, odorless, tasteless, or having a slight odor and taste of creosote.

Q.—What results from keeping it in a cold place for a considerable time?
A.—Crystals of Guaiacol Carbonate separate.

Q.—How may these be reincorporated?
A.—By warming.

Q.—What can you say of the solubility?
A.—Insoluble in water; soluble in alcohol, petroleum benzin and fixed oils.

Q.—How would you dispense it in aqueous mixture?
A.—Dissolve it in a bland fixed oil and emulsify it.

Q.—What advantage does the Carbonate have over the creosote for internal administration?
A.—It is not so irritating to the alimentary tract.

Q.—What is the dose?
A.—1 Gm.

Q.—May Coal-tar creosote be dispensed when Creosote is called for?
A.—No, as that is nothing more or less than Phenol.

Q.—Give the official definition for **Guaiacol.**
A.—The monomethyl ether (C_6H_4) (OH) (OCH_3) 1:2 of ortho-dihydroxybenzene, obtained from wood-tar creosote or prepared synthetically. Preserve in well-closed containers protected from the light.

Q.—Is it a liquid or a solid?
A.—It may be either.

Q.—What is the melting point if solid?
A.—28° C.

Q.—Does it solidify below that point?
A.—No, once liquefied it will remain liquid at rather low temperature.

Q.—How is it obtained?
A.—By the fractional distillation of Creosote, reserving that portion which comes over between 200° C. and 205° C.

Q.—To what extent is it present in Creosote?
A.—From 60% to 90%.

Q.—How is it prepared synthetically?
A.—By the methylation of Catechol, or from ortho-anisidin by diazotizing and boiling.

Q.—What can you say of its solubility?
A.—Soluble in 53 parts of water; 0.8 mil glycerin. Miscible with alcohol, chloroform, ether or acetic acid.

Q.—What is it therapeutically?
A.—Antiseptic and expectorant, especially in tuberculosis.

Q.—What is the dose?
A.—0.5 mil.

Q.—Give the official definition for **Guaiacol Carbonate.**
A.—A guaiacol derivative $(C_6H_4(OCH_3)O)_2.CO$.

Q.—What is the trade name for it?
A.—Duatol.

Q.—Describe it.
A.—A crystalline powder, odorless and tasteless or having a slight aromatic odor and taste.

Q.—How is it obtained?
A.—By passing $COCl_2$ into Guaiacol previously dissolved in Sodium Hydroxide solution.

Q.—What can you say of its solubility?
A.—Insoluble in water; soluble in 60 parts of alcohol, 1 of chloroform, 18 of ether. Freely soluble in benzene, slightly in fixed oils and glycerin.

Q.—What is it used for?
A.—Treatment of tuberculosis and typhoid fever.

Q.—What is its value in typhoid fever?
A.—Lessens decomposition in the intestines.

Q.—What is the dose?
A.—1 Gm.

PRODUCTS OF THE DESTRUCTIVE DISTILLATION OF COAL

Q.—Give the English for **Pix Lithanthracis.**
A.—Coal tar.

Q.—Give the official definition for Pix Lithanthracis.
A.—The tar obtained as a by-product in the destructive distillation of coal in the manufacture of illuminating gas.

Q.—What preparation of it is official?
A.—Liquor Picis Carbonis.

Q.—What is the synonym for **Phenol?**
A.—Carbolic acid.

Q.—Give the official definition.

A.—Hydroxybenzene obtained from coal tar or made synthetically. It contains not less than 97% of C_6H_5OH. Preserve it in well-closed containers protected from the light.

Q.—Is it an acid?

A.—No.

Q.—How is it made synthetically?

A.—Heat benzene with fuming sulphuric acid, this forms benzenesulphonic acid, fuse this with caustic soda, $C_6H_5SO_3Na + 2NaOH = H_2O + Na_2SO_3 + C_6H_5ONa$, now the addition of an acid liberates pure Phenol.

Q.—Why is the synthetic better than the natural?

A.—Because it can be obtained in a greater degree of purity.

Q.—In what form is it found?

A.—In colorless, interlaced or separate needle-shaped crystals or as a white crystalline mass, sometimes acquiring a red tint, having a somewhat aromatic odor.

Q.—What effect does it have on the skin?

A.—Cauterizes and renders it white.

Q.—What can you say of its solubility?

A.—Dissolves in 15 parts of water; very soluble in alcohol, glycerin, chloroform, ether, carbon disulphide.

Q.—At what temperature will it congeal?

A.—At 38° C.

Q.—What name is given to that part of the coal tar from which Phenol is obtained?

A.—Dead oil.

Q.—What is the test for its identity?

A.—A drop of Ferric Chloride T. S. added to an aqueous solution will develop a violet-blue color which persists.

Q.—How does it affect collodion?

A.—Coagulates collodion.

Q.—What are its therapeutic properties?

A.—Antiseptic, caustic, antiemetic.

Q.—What is the dose?

A.—0.06 Gm. largely diluted.

Q.—In what form does it exert its antiseptic properties most energetically?

A.—In aqueous solution.

Q.—Why is it not just as effective in alcoholic or glycerin solution?

A.—In these liquids it does not ionize.

Q.—What precautions must be observed in the application of Phenol or any of its preparations?

A.—There must be opportunity for the Phenol to evaporate else it will penetrate into the tissues and cause extensive dry gangrene.

Q.—Just what does this mean?

A.—That no preparation of Phenol should be applied to the skin and covered with a bandage.

Q.—What is the antidote for Phenol poisoning?

A.—The most favored one seems to be the administration of alcohol, but experimental work seems to indicate that this is not effective. Emesis seems to be best, then administration of demulcent drinks. Empty stomach with pump or tube.

Q.—Why must the stomach pump or tube be used?

A.—Because of the local anesthetic effect of the phenol which prevents emesis.

Q.—Is Phenol inflammable?

A.—No, but its vapors are.

Q.—How can a strong solution of Phenol be prepared?

A.—By using about 5% of glycerin, then adding the required amount of water.

Q.—What other form of Phenol is official?

A.—**Phenol Liquefactum.**

Q.—What percentage of Phenol must it contain?

A.—87%.

Q.—How is it prepared?

A.—The open container is put in a water-bath and heat applied until the crystals melt, then pour into a tared vessel and weigh; for each nine Gm. of Phenol add one Gm. of distilled water and mix thoroughly.

Q.—What causes the cloudiness when Liquefied Phenol is mixed with a fixed oil?

A.—The presence of the water used to preserve the Phenol in a liquid condition.

Q.—How may the red color be removed from Phenol?

A.—Add a little alcohol to it, then set in a cold place, the phenol will congeal but not the alcohol. The alcohol dissolves the red color and may be decanted.

Q.—By what other name is **Cresol** called?

A.—Cresylic acid.

Q.—What is the official definition?

A.—A mixture of isomeric cresols ($C_6H_4CH_3OH$) obtained from coal tar.

Q.—How many isomeric cresols are there?

A.—Three.

Q.—Name them.

A.—Ortho, meta and para cresol.

Q.—What can you say of the solubility of Cresol?

A.—Soluble in 50 parts of water. Readily soluble in solutions of alkali hydroxides.

Q.—What is it therapeutically?

A.—Antiseptic, germicide, disinfectant.

Q.—How does it compare with Phenol as an antiseptic?

A.—It has a considerably higher value.

Q.—What especially detracts from its use?

A.—Its sparing solubility.

Q.—What has been done to remedy this condition?

A.—A solution has been made official which is fairly soluble in water.

Q.—What is its title and strength?

A.—Liquor Cresolis Compositus, 50% cresol.

Q.—What is its composition?

A.—A 50% solution of cresol in potassium soap.

Q.—What trade preparations are like this?

A.—Lysol, trikresol.

Q.—Is it poisonous?

A.—Yes, quite so; less so than phenol, however, probably because of less solubility.

Q.—What is the internal dose?

A.—0.05 mil.

Q.—What is the treatment for Cresol poisoning?

A.—Same as Phenol.

Q.—Give the official definition for **Acidum Salicylicum.**

A.—Orthohydroxybenzoic acid, existing naturally in combination in various plants, but generally prepared synthetically. It contains when dried to constant weight, not less than 99.3% of $C_6H_4(OH)(COOH)$. Preserve it in well-closed containers.

Q.—In what combination does it naturally exist?

A.—As methyl salicylate.

Q.—In what plants does it naturally exist?

A.—Gaultheria procumbens and Betula lenta.

Q.—How is it prepared synthetically?

A.—Phenol is treated with NaOH or Na_2CO_3 to form Sodium Phenolate, then CO_2 is forced in and forms Sodium Salicylate. This is decomposed with a calculated quantity of hydrochloric acid which throws out the salicylic acid. It may then be put into solution, filtered through animal charcoal and recrystallized.

Q.—What can you say of the solubility?

A.—Soluble in 460 parts of water; 2.7 parts of alcohol; 42 parts chloroform; 3 parts ether.

Q.—What is the identity test?

A.—A saturated solution with a drop of ferric chloride T. S. will give a bluish-violet color; if the solution be highly diluted it will give a violet-red color.

Q.—How sensitive is this test?

A.—Shows in dilutions of 1:400,000 (1 gr. in 7 gal.).

Q.—What physical differences are seen in the different sources of the acid?

A.—Synthetic acid is white and odorless; prepared from methyl salicylate it may have a slightly yellow or pink tint and a slight gaultheria-like odor.

Q.—What is it therapeutically?
A.—Antirheumatic, antiseptic, irritant.

Q.—What is the dose?
A.—0.75 Gm.

Q.—What is Aspirin?
A.—Acetyl salicylic acid.

Q.—What official substance is made by reaction between Phenol and Salicylic Acid?
A.—**Phenylis Salicylas.**

Q.—What is the synonym?
A.—Salol.

Q.—Give the official definition.
A.—The phenyl ester of salicylic acid ($C_6H_4(OH)COOC_6H_5$). Preserve it in well-closed containers in a cool place.

Q.—How is it prepared?
A.—By heating salicylic acid and phenol to 200° C.

Q.—What can you say of its solubility?
A.—Soluble in 6670 parts of water; 6 mils of alcohol.

Q.—What is its identity test?
A.—Addition of ferric chloride T. S. to an alcoholic solution 1:20 gives a violet color.

Q.—What is it therapeutically?
A.—Antirheumatic, intestinal antiseptic.

Q.—What is the dose?
A.—0.3 Gm.

Q.—How does it act as an intestinal antiseptic?
A.—Splits up in the intestines into its constituents phenol and salicylic acid.

Q.—What action do the stomach juices have on it?
A.—None at all as it is not altered by acids.

Q.—What especial use is made of it in pharmacy?
A.—Used to coat enteric pills.

Q.—Give the official definition for **Phenolphthaleinum.**
A.—A dibasic phenol derivative (dihydroxyphthalophenone) $(C_6H_4OH)_2CO.C_6H_4CO$.

Q.—Describe it.
A.—White or faintly yellowish-white crystalline powder, odorless, tasteless; permanent in air.

Q.—What can you say of its solubility?
A.—Insoluble in water; soluble in 13 mils alcohol.

Q.—How do alkalies affect it?
A.—Form red-colored solutions.

Q.—What is it therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—0.15 Gm.

Q.—What is its greatest use?
A.—As an indicator in analytical chemistry.

Q.—Give the official Latin title for Phenacetine.
A.—**Acetphenetidinum.**

Q.—Give the official definition.
A.—The monoacetyl derivative ($C_6H_4(OC_2H_5).NH.CH_3.CO$) of para-amidophenetol.

Q.—What can you say of its solubility?
A.—Soluble in 1310 mils of water; 15 mils alcohol; 14 mils chloroform.

Q.—What impurities are tests given for under Acetphenetidin?
A.—Readily carbonizable impurities, acetanilid, paraphenetidin.

Q.—What is it therapeutically?
A.—Antipyretic, analgesic.

Q.—Is it a heart depressant?
A.—Yes, slightly depressant.

Q.—What is the dose?
A.—0.3 Gm.

Q.—How often may the dose be repeated?
A.—Every three or four hours.

Q.—What is the synonym for **Antipyrina?**
A.—Phenazone.

Q.—What is the chemical name for it?
A.—Phenyldimethylpyrazolon.

Q.—To what class of proximate principles is it sometimes likened?
A.—To the alkaloids; frequently called an artificial alkaloid.

Q.—How does its solution act with Tannic Acid T. S.?
A.—Produces a copious white precipitate.

Q.—How does it react with Spt. Aetheris Nitrosi?
A.—Gives green coloration.

Q.—What is the green substance?
A.—Iso-nitroso-antipyrine.

Q.—Is it poisonous?
A.—No.

Q.—Is this reaction confined to Sweet Spirit of Nitre?
A.—No, any nitrite in acid solution will give the same color reaction.

Q.—If the Sweet Spt. Nitre is neutral will the color show?
A.—No, an acid reaction is necessary.

Q.—What can you say of its solubility?
A.—Soluble in less than its own weight of water, 1.3 mils of alcohol, 1 mil of chloroform.

Q.—What is it therapeutically?
A.—Antipyretic, analgesic, haemostatic, antirheumatic in combination with salicylates.

Q.—What is the dose?
A.—0.3 Gm.

Q.—What is the trade name for **Acidum Phenylcinchoninicum?**
A.—Atophan.

Q.—Give the official definition.
A.—An organic acid 2-phenyl-quinoline-4-carboxylic acid ($C_6H_5C_9H_5N.COOH$).

Q.—How may it be prepared?
A.—Reaction between Cinchonidine and KOH.

Q.—What is it therapeutically?
A.—Antirheumatic.

Q.—What is the dose?
A.—0.5 Gm.

Q.—What is the synonym for **Trinitrophenol?**
A.—Picric acid.

Q.—Give the official definition.
A.—Trinitrophenol. $(C_6H_2(OH)(NO_2)_3 1:2:4:6$. Preserve in well-stoppered bottles, in a cool place, remote from fire.

Q.—What note of caution is mentioned under this official substance?
A.—For safety in transportation it is usually mixed with about 20% water. Before applying the U. S. P. tests it should be dried to a constant weight over H_2SO_4.

Q.—How is it made?
A.—By heating Phenol with strong Nitric Acid or by the action of strong nitric acid on woolen and silk fabrics, albumin, animal matter, indigo.

Q.—Describe it.
A.—Small yellowish crystals, odorless, intensely bitter, may explode by percussion or when rapidly heated.

Q.—What can you say of its solubility?
A.—Soluble in 78 mils of water.

Q.—What use is made of it?
A.—In solution for dressing burns; alkaloidal reagent; as a dye.

BENZENE AND DERIVATIVES

Q.—What is the source of **Benzene?**
A.—Distillation of Coal tar.

Q.—By what other name is it called?
A.—Benzole.

Q.—What is its chemical formula?
A.—C_6H_6.

Q.—Describe it.
A.—Colorless liquid, ethereal odor, crystallizes at 5.4°C, boils at 80.5°C, Sp. Gr. 0.86. Insoluble in water, but readily miscible with alcohol and ether, highly inflammable.

Q.—What use is made of Benzene?
A.—It is a good solvent for fats and oils, but is most largely used for the production of its derivatives.

Q.—Is it official?
A.—No.

Q.—How is nitro-benzene made?
A.—By reaction between Nitric Acid and Benzene.
$$C_6H_6 + HNO_3 = C_6H_5NO_2 + H_2O.$$

Q.—By what other name is this compound known?
A.—Essence or oil of mirbane.

Q.—What use is made of it?
A.—As artificial oil of bitter almond for flavoring soaps and perfumes.

Q.—What is the chemical name for Anilin?
A.—Amido benzol; phenyl amine.

Q.—How is it made?
A.—By reducing nitrobenzene with nascent hydrogen.
$$C_6H_5NO_2 + 3\ H_2 = C_6H_5NH_2 + 2\ H_2O.$$

Q.—Describe it.
A.—Describe colorless liquid; peculiar odor; acrid, burning taste; Sp. Gr. 1.02; boils at 184.8°; crystallizes at 8°C; soluble in 31 parts of water. When exposed to air turns brown.

Q.—How does it react with acids?
A.—Forms salts which are colorless when first formed, but which turn red upon the absorption of moisture.

Q.—Give the official definition for **Acetanilide.**
A.—The monoacetyl derivative of anilin ($C_6H_5NH.CH_3CO$).

Q.—What is another name for it?
A.—Antifebrin.

Q.—What is its chemical name?
A.—Phenyl acetamide.

Q.—How is it made?
A.—By refluxing anilin and glacial acetic acid for several hours, then purifying by recrystallization from boiling water.

Q.—Describe it.
A.—Colorless, shining, micaceous crystalline laminæ or a crystalline powder, having a slightly burning taste, permanent in the air.

Q.—What can you say of its solubility?
A.—Solubility in 190 mils of water. 3.4 mils alcohol.

Q.—What is it therapeutically?
A.—Antipyretic, analgesic, antiseptic.

Q.—What is its particular action on the system?
A.—A heart depressant.

Q.—Might it be considered poisonous?
A.—Yes.

Q.—What is the most prominent poison symptom?
A.—Cyanosis, blueness of the lips and finger-nails.

Q.—How should this be treated?
A.—Stimulation, use alcohol and strychnine, keep up body heat, use artificial respiration.

Q.—What is the dose?
A.—0.2 Gm.

Q.—What common preparation of it is official?
A.—Pulv. Acetanilidi Compositus.

Q.—What trade preparation is similar to this?
A.—Antikamnia.

Q.—What is the synonym for **Methylthioninæ Chloridum**?
A.—Methylene blue.

Q.—How is it made?
A.—Reaction of H_2S on the oxidation product of paraamido-di-methyl-anilin.

Q.—Describe it.
A.—A dark green crystalline powder or prismatic crystals having a luster resembling bronze.

Q.—What can you say of its solubility?
A.—Freely soluble in water and alcohol.

Q.—What is it therapeutically?
A.—Antiseptic, also said to be anodyne, hypnotic and diuretic.

Q.—What is the dose?
A.—0.15 Gm.

Q.—When ordered in mass, how is it best dispensed?
A.—Triturate with an equal weight of powdered licorice root, massing with glucose. Take care to keep the mass and fingers well dusted to avoid stains.

Q.—Give the official title for Resorcin.
A.—**Resorcinol.**

Q.—Give the official definition.
A.—Metadihydroxybenzene. It should contain not less than 99.5% of $C_6H_4(HO)_2$ 1:3. Preserve it in well-closed containers, protected from the light.

Q.—How is it made?
A.—By fusing such resins as galabanum or asafetida with potash, also by fusing NaOH with sodium metabenzenedisulphonate.

Q.—Describe it.
A.—Colorless or nearly colorless needle-shaped crystals or as a powder having a faint peculiar odor and a sweetish taste followed by a bitter taste. It acquires a pink tint on exposure to light and air.

Q.—What can you say of its solubility?
A.—Soluble in less than its own weight of water or alcohol.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is the dose?
A.—0.125 Gm.

Q.—How is it generally used?
A.—In solution, from 3% to 5%.

Q.—Is it poisonous?
A.—Not generally considered so, but it may show its phenolic character when used too extensively.

Q.—What changes are likely to occur in preparations containing Resorcinol?
A.—Changes in color.

Q.—What is it used for internally?
A.—Particularly in fermentive dyspepsia.

Q.—How is it then administered?

A.—One hour after food, in plenty of water, 7 gr. doses three times daily.

Q.—What are the synonyms for **Benzosulphinidum?**

A.—Saccharin. Glusidum.

Q.—Give the official definition.

A.—The anhydride ($C_6H_4SO_2.CONH$) of ortho-sulphamide-benzoic acid.

Q.—How may it be made?

A.—By treating ortho-sulphobenzoic acid with ammonia.

Q.—Describe it.

A.—White crystals or a white crystalline powder, odorless or having a faint aromatic odor; its solutions have an intensely sweet taste.

Q.—What can you say of its solubility?

A.—Soluble in 290 mils of water; 31 mils of alcohol.

Q.—How may aqueous solutions of it be made?

A.—By the addition of sodium bicarbonate.

Q.—How does it compare with sugar in sweetness?

A.—About 500 times sweeter than sugar.

Q.—What is it used for in medicine?

A.—As a sweetening agent in foods for diabetic patients, it is also antiseptic.

Q.—How does a solution affect Fehling's Solution?

A.—Does not reduce Fehling's Solution.

Q.—If such reduction does occur what does it indicate?

A.—Probable presence of glucose or milk sugar.

Q.—What is the dose?

A.—0.2 Gm.

Q.—How does the Pure Food and Drugs Act view **Saccharin?**

A.—It is unlawful to use it in foodstuffs.

Q.—What is the synonym for **Betanaphthol?**

A.—Naphthol.

Q.—What is the official definition?

A.—A monohydroxyphenol ($C_{10}H_7OH$) of the naphthalene series. Preserve it in well closed containers protected from the light.

Q.—Describe it.

A.—Colorless or pale buff, shining crystalline laminæ or white or yellowish white crystalline powder, having a faint phenol-like odor and a pungent taste.

Q.—What can you say of its solubility?

A.—Soluble in 1000 parts of water.

Q.—What is it therapeutically?

A.—Antiseptic.

Q.—How is it generally used?

A.—Generally externally in the form of an ointment or paste.

Q.—Is it ever given internally?

A.—Yes.

Q.—What bad effects may result from large internal doses?

A.—Fatal inflammation of the kidneys has resulted.

Q.—What is the dose?

A.—0.250 Gm.

PETROLEUM DERIVATIVES

Q.—What is the source of **Petroleum?**

A.—Found naturally in the earth.

Q.—By what other names is Petroleum called?

A.—Rock oil; Stone oil; Seneca oil; Coal oil.

Q.—To what class of chemical compounds does it belong?

A.—The hydrocarbons.

Q.—What does it comprise?

A.—Several liquids having boiling points ranging from 30°C. to 300°C.

Q.—How are they separated?

A.—By fractional distillation.

Q.—What is the first one to come over in distillation?

A.—Rhigoline, which comes over from 30° to 45°C. It is the lightest liquid known.

Q.—At what temperature does Benzin come over?
A.—From 40° to 80°C.

Q.—By what other name is it sometimes called?
A.—Petroleum ether.

Q.—Give the chief chemical constituents of **Benzinum?**
A.—Hydrocarbons, chiefly of the marsh-gas series (C_5H_{12}; C_6H_{14} and homologous compounds).

Q.—Give its physical properties.
A.—A transparent, colorless liquid, characteristic odor, neutral reaction. Highly inflammable, its vapor when mixed with air and ignited explodes violently. Specific gravity 0.65, insoluble in water, soluble in 6 parts of alcohol and readily soluble in chloroform, ether, fixed and volatile oils except castor oil.

Q.—What form of Benzinum is official?
A.—**Benzinum Purificatum.**

Q.—With what is Benzinum sometimes adulterated?
A.—Coal tar benzene.

Q.—How may its presence be detected?
A.—If 5 drops be added to a mixture of 40 drops of sulphuric acid and 10 drops of nitric acid, in a test tube and the liquid warmed for about 10 minutes and then set aside for a half hour, on diluting it with water it will evolve a bitter almond-like odor of nitrobenzene if coal tar benzene is present.

Q.—How is Benzinum purified?
A.—By first washing it with an aqueous solution of sulphuric acid and potassium permanganate for 24 hours, then decanting the benzine and washing it again with a solution of potassium permanganate and sodium hydroxide in water. After which it is repeatedly rinsed with clear water.

Q.—What use is made of Purified Benzin?
A.—It is a good solvent for fats and oils, hence a valuable cleaning fluid. It is used to deodorize opium and in making the deodorized tincture of opium and for removing caoutchouc from lactucarium when preparing tincture of lactucarium.

Q.—What precautions are to be observed when selling it?
A.—Use a "scare" label cautioning against opening the container near a flame.

Q.—How does Benzene differ from Benzin?

A.—

	Benzene	*Benzin*
Source	Coal tar.	Petroleum.
Chem. form.	C_6H_6.	C_5H_{12}—C_6H_{14}.
Boiling point	80° C.	40° to 80° C.
Sp. Gr.	0.878.	0.65.

Q.—Give the definition for Benzinum Purificatum.

A.—A purified distillate from American petroleum consisting of hydrocarbons, chiefly of the marsh-gas series. Preserve it in well-closed containers, in a cool place, remote from fire.

Q.—Name 5 official substances obtained from Petroleum.

A.—Benzinum purificatum, petrolatum liquidum, petrolatum, petrolatum album, paraffinum.

Q.—Give the official definition for **Petrolatum Liquidum.**

A.—A mixture of liquid hydrocarbons obtained from petroleum. Preserve it in well-closed containers protected from the light.

Q.—What two kinds are there?

A.—Light liquid petrolatum and heavy liquid petrolatum.

Q.—What is the particular difference between the two?

A.—The specific gravity and viscosity.

Q.—What is the specific gravity?

A.—The U. S. P. does not distinguish between the two but gives the Sp. Gr. as ranging from 0.828 to 0.905 at 25°C.

Q.—What is the viscosity of each?

A.—For the Light Liquid Petrolatum, not more than 3; for the Heavy Liquid Petrolatum, **not less** than 3.1.

Q.—How is viscosity determined?

A.—By the use of a 50 mil pipette. A permanent mark is made about 2 cm. below the bulb of the pipette, then it is filled with water to the upper mark. The water is permitted to run out and the time consumed in seconds, in falling from the upper to the lower mark, is taken as the standard. Now the clean and dry pipette is filled to the same mark with liquid petrolatum and allowed to run out in the same way, the time in seconds being noted; the time required is divided by the time required for the

water to fall the same distance and the quotient is the viscosity of the petrolatum.

Q.—Describe Petrolatum Liquidum.

A.—A colorless, transparent, oily liquid free or nearly free from fluorescence, odorless and tasteless when cold and possessing not more than a faint odor of petroleum when heated.

Q.—What can you say of its solubility?

A.—Insoluble in water or alcohol; soluble in ether, chloroform, benzin, fixed and volatile oils.

Q.—What use is made of it?

A.—As a vehicle for numerous antiseptics used in spraying the nose and throat. For the official Nebulæ and Liquid and Solid Petroxolins. As a lubricator and as the basis for numerous sweeping or anti-dust mixtures.

Q.—What is it used for therapeutically?

A.—In the treatment of constipation.

Q.—Is the Liquid Petrolatum absorbed?

A.—No, its action is entirely mechanical.

Q.—By what other names is it known?

A.—Liquid paraffin, mineral oil, paraffin oil.

Q.—What is the test for the presence of Solid Paraffins?

A.—When cooled to 10°C. it must not become more than opalescent.

Q.—What other impurities are tested for?

A.—Acids, carbonizable impurities, sulphur compounds.

Q.—What is the dose?

A.—15 mils.

Q.—What is Albolene?

A.—A proprietary liquid petrolatum, said to be made from Russian petroleum.

Q.—What is the official definition for **Petrolatum?**

A.—A purified mixture of semi-solid hydrocarbons, obtained from petroleum.

Q.—What are the synonyms?

A.—Petrolatum ointment; petroleum jelly.

Q.—Under what name was it first put on the market?

A.—Vaseline.

Q.—Describe it.

A.—A yellowish to light amber unctuous mass, with not more than a slight fluorescence, even after being melted. Entirely free from taste and odor.

Q.—What can you say of its solubility?

A.—Insoluble in water and practically so in alcohol; freely soluble in ether, chloroform, carbon disulphide, fixed and volatile oils.

Q.—What is its Sp. Gr.?

A.—0.82 to 0.865 at 60°C.

Q.—What is its melting point?

A.—38° to 54°C.

Q.—How is it tested for the presence of acids or alkalies?

A.—Shake with an equal volume of hot distilled water and test with litmus; it should remain neutral.

Q.—How is it tested for fixed oils, fats or resins?

A.—Digest 10 Gm. at 100°C. with 10 Gm. of NaOH and 50 mils of hot water for half an hour, then separate the aqueous layer and supersaturate it with sulphuric acid when no oily or solid substance should separate.

Q.—What is its principal use?

A.—As an emollient and as an ointment vehicle.

Q.—Why is it a good ointment vehicle?

A.—It does not penetrate the skin, hence is valuable in carrying medicinal substances designed to medicate the surface of the skin only. Not being a fat it does not become rancid.

Q.—By what other names is Petrolatum found in the market?

A.—Vaseline, petroleum jelly, petroline.

Q.—Give the definition for **Petrolatum Album**?

A.—Petrolatum wholly or nearly decolorized.

Q.—How does it differ from Petrolatum?

A.—Only in being white instead of yellowish.

Q.—Give the official definition for **Paraffinum.**

A.—A purified mixture of solid hydrocarbons usually obtained from petrolatum.

Q.—Describe it.

A.—A colorless translucent mass, crystalline, without odor or taste and slightly greasy to the touch. Specific gravity 0.9; melts at 50.6 to 57° C. Insoluble in water or alcohol.

Q.—What is it used for?

A.—To give firmness to ointments and cerates. In surgery, liquefied and injected subcutaneously to correct deformities.

Q.—What is Ambrine?

A.—A proprietary preparation consisting principally of paraffin which carries some antiseptic oils used as a dressing for burns. It is melted then sprayed on the wound or painted on after the wound has been cleansed and dried.

Q.—How is **Ichthyol** obtained?

A.—By the destructive distillation of a bituminous shale found in Tyrol. The oil so obtained is treated with sulphuric acid yielding ichthyolsulphonic acid. Reaction now with NH_3 forms ammonium ichthyo sulphonate or the ichthyol of commerce.

Q.—Is none produced in this country?

A.—Since the outbreak of the European war when the supply was shut off, it is said that a similar product is obtained in Texas by dry distillation of a native shale.

Q.—What is it therapeutically?

A.—Antiseptic and stimulant.

Q.—What effect does distillation with steam or treatment with H_2O_2 have on it?

A.—Deprives it of its disagreeable odor.

Q.—What name is then applied to it?

A.—Desichthyol.

Q.—What can you say of the solubility of Ichthyol?

A.—Soluble in water, alcohol, and glycerin.

CARBOHYDRATES

Q.—What gives the name to the group Carbohydrates?

A.—Because they are compounds containing Carbon in combination with Hydrogen and Oxygen, in which the Hydrogen and Oxygen are present in the proportion of the water molecule, i.e., two atoms of hydrogen for each atom of oxygen.

Q.—What substances are included in the group Carbohydrates?
A.—Starches, sugars, dextrins, gums, cellulose.

Q.—Is **Starch** official?
A.—Yes.

Q.—What is the Latin name?
A.—Amylum.

Q.—Give the official definition for Amylum?
A.—Starch separated from the grain of Zea Mays.

Q.—How is it obtained?
A.—The corn is first steeped in tanks until soft to remove most of the oil and inorganic matter. It is now ground with water and strained, then stirred with a solution of caustic soda to remove the rest of the oil and some albuminoid. This affects the precipitation of the gluten and other impurities, the starch then subsides and is purified by further washing.

Q.—What is the chemical formula for Starch?
A.—$C_6H_{10}O_5$ or a multiple of this.

Q.—Is it water-soluble?
A.—Not in cold water. It may be made into a partial solution by boiling with water for a time.

Q.—What is the identity test for starch?
A.—It developes a deep-blue color with Iodine T. S.

Q.—What preparation of Starch is official?
A.—Glyceritum Amyli, 10% U. S.

Q.—How does heat affect the blue color in the Iodine test for Starch?
A.—Heat causes the color to disappear, but it returns on cooling.

Q.—How does Starch affect Fehling's Solution?
A.—Has no effect on it.

Q.—Is **Dextrin** official?
A.—Yes. Described in the N. F.

Q.—Give its official definition.
A.—A mixture of soluble carbohydrates, amylodextrin, achroodextrin, erythrodextrine and maltodextrin, together with a variable amount of unconverted starch obtained by the incomplete hydrolysis of starch by the action of an acid.

Q.—Is there more than one kind of Dextrin?
A.—Yes, yellow and white.

Q.—Which one is official?
A.—The white. Dextrinum Album.

Q.—How is Dextrin obtained?
A.—1000 parts of starch are mixed with 40 parts of nitric acid and 300 parts of water and made into a paste. This is heated for about two hours at 100° to 120°C. For this purpose it is spread in thin layers and heated with superheated steam, with constant stirring.

Q.—Is it water-soluble?
A.—Only partly so in cold water, but completely soluble in 3 parts of boiling water.

Q.—What effect does it have on Fehling's Solution?
A.—Does not change in the cold but reduces it when boiled.

Q.—How does Iodine T. S. affect it?
A.—Turns it mahogany-red.

Q.—By what other names is it known?
A.—British Gum; vegetable gum; starch gum; gommeline.

Q.—What preparation is official?
A.—Pasta Dextrinata, 33%, N. F.

Q.—How can it be distinguished from other gums?
A.—Make a solution of 1:20 and filter, add to one portion lead acetate T. S., to another basic lead acetate T. S. and no precipitate forms at once but on the addition of a few drops of ammonia water to the mixtures precipitation at once takes place.

Q.—What use is made of Dextrin?
A.—As a paste and emulsifying agent.

Q.—Where does Dextrin stand in its relation to Starch and Glucose?
A.—It is a midway product in the making of Glucose from Starch.

Q.—What is the chemical formula for **Glucosum?**
A.—$C_6H_{12}O_6$.

Q.—How is it produced commercially?
A.—Made by heating starch with dilute sulphuric acid.

Q.—Is it official?
A.—Yes.

Q.—How does it affect the plane of polarized light?
A.—**Usually** deflects it to the right. U. S. P. does.

Q.—In what forms is it found in commerce?
A.—Both solid in the granular form, and as a liquid.

Q.—By what names is the liquid glucose known?
A.—Mixing glucose; corn syrup; jelly glucose; confectioners' glucose.

Q.—What foreign substance is found in nearly all commercial glucose?
A.—Calcium sulphite.

Q.—Why is this added?
A.—As a preservative to prevent fermentation.

Q.—What is the crystalline glucose usually called?
A.—Grape sugar.

Q.—How is it obtained in the crystal form?
A.—By adding crystals of dextrose to a highly concentrated glucose syrup and allowing to crystallize.

Q.—How soluble is it?
A.—Soluble in about its own weight of water and in 50 parts of alcohol.

Q.—Is it fermentable?
A.—Yes, directly fermentable.

Q.—Is it more or less sweet than sugar?
A.—Less sweet.

Q.—How does sulphuric acid affect it?
A.—No effect when mixed cold.

Q.—How does it affect alkaline cupric tartrate T. S.?
A.—Reduces it to cuprous oxide.

Q.—To what is this reducing action due?
A.—To the presence of an aldehyde radical.

Q.—What is Levulose?
A.—An uncrystallizable syrup, having the same chemical formula as glucose.

Q.—Why is it called Levulose?
A.—Because it turns the plane of polarized light to the left.

Q.—In what official substance is it found?
A.—In honey.

Q.—What use is made of glucose?
A.—It is used in the place of sugar and syrup and as an adulterant of these. The liquid glucose also finds much favor as a pill excipient.

Q.—Give the official definition for Glucosum.
A.—A syrupy product obtained by the incomplete hydrolysis of starch, consisting chiefly of dextrose (d-glucose) $C_6H_{12}O_6$ and dextrins.

Q.—Is Glucosum acid, alkaline or neutral?
A.—It is neutral or only slightly acid.

Q.—What is the source of **Manna**?
A.—It is an exudation from an ash tree native to the Mediterranean regions.

Q.—What is its principal constituent?
A.—Mannite.

Q.—What is the chemical formula for mannite?
A.—$C_6H_8(OH)_6$.

Q.—To what class of compounds does it belong?
A.—The alcohols.

Q.—What is Manna therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—16 Gm.

Q.—Into what pharmacopoeial preparation does it enter?
A.—Infusum Sennæ Compositum.

Q.—What preparation in the National Formulary?
A.—Syrup of Manna.

Q.—What is the strength of the Syrup?
A.—12.5%.

Q.—Give the official definition.
A.—The dried saccharine exudation of Fraxinus Ornus.

Q.—What is the Latin title for **Honey?**
A.—Mel.

Q.—What is the source of Honey?
A.—It is deposited in the honey comb by the honey bee.

Q.—What occurs when honey is allowed to stand for some time?
A.—It separates into two layers, a rather solid granular lower layer and a liquid upper layer.

Q.—What is the composition of the granular layer?
A.—It is principally grape-sugar or dextrose.

Q.—What is the upper layer?
A.—Fruit sugar or levulose.

Q.—What are the more common adulterants of Honey?
A.—Artificial grape sugar; starch paste; beet-root molasses; cane sugar.

Q.—How does honey affect polarized light?
A.—Turns it to the left.

Q.—What is honey used for in pharmacy and medicine?
A.—Generally as a vehicle. Its addition to mouth washes and gargles is said to increase secretions from the mucous membranes and to relieve congestion. It is a good pill excipient.

Q.—What other form of honey is official?
A.—**Mel Depuratum.**

Q.—What is the English title?
A.—Purified honey.

Q.—How is it purified?
A.—Heated on a water-bath with paper pulp and skimmed, the loss in weight being made up with distilled water. Strained and to the strained honey 5% of glycerin added.

Q.—Why is the glycerin added?
A.—To prevent granulation and separation into two layers.

Q.—What preparation of the pharmacopœia is made from Clarified Honey?
A.—Mel Rosæ. Honey of Rose.

Q.—How is it made?
A.—By mixing 12 mils fluidextract rose with enough clarified honey to make 100 Gm.

Q.—Into what preparation does clarified honey enter?
A.—Massa Hydrargyri.

Q.—Into what N. F. preparations does Honey enter?
A.—Oxymel Scillæ N. F. Mel Rosæ et Sodii Boratis, 85% N. F. Mel Sodii Boratis 85%, N. F.

SUGARS

Q.—Into what two general classes are sugars divided?
A.—Saccharoses and glucoses.

Q.—What is the chemical formula for the type Saccharose?
A.—$C_{12}H_{22}O_{11}$.

Q.—What is the Latin title for sugar?
A.—**Saccharum.**

Q.—What is the source of the official Sugar?
A.—From the juice of sugar cane and sugar beets.

Q.—How is it prepared?
A.—The juice is expressed from the cane or beets. This is heated with lime for the purpose of clarifying it and neutralizing the free acid present. It is filtered through bone-black, concentrated in vacuum pans until at the point of crystallization, then dried in centrifugals.

Q.—What name is given to the portion which does not crystallize?
A.—Molasses.

Q.—How soluble is sugar in water?
A.—Soluble in half its weight of water.

Q.—Is it soluble in alcohol?
A.—Practically, "No," as it requires 170 parts to dissolve one part of sugar.

Q.—What is the meaning of the terms "dextrogyrate, dextrorotatory, lævogyrate, lævorotatory?"
A.—Turns the plane of polarized light to the right if dextrogyrate or dextrorotatory. Turns the plane of polarized light to the left if lævogyrate or lævorotatory.

Q.—How does Sugar affect the plane of polarized light?
A.—Turns it to the right about 66 degrees.

Q.—What is formed when sugar is heated with sulphuric acid?
A.—Invertase or invert sugar.

Q.—Is sugar fermentable?
A.—No, not directly.

Q.—If sugar is strongly heated, what is the resulting product called?
A.—Caramel.

Q.—How does Sugar affect Fehling's Solution?
A.—Has no effect on it.

Q.—Is the Invert Sugar dextrorotatory or lævorotatory?
A.—Lævorotatory. The dextrose molecule produced is $+52$ and the lævorotatory molecule is -90; this makes the mixture lævorotatory.

Q.—Give the official definition for Saccharum.
A.—Sucrose ($C_{12}H_{22}O_{11}$) obtained from the cultivated varieties of Saccharum officinarum and from Beta vulgaris and from other sources.

Q.—What impurities may be found in Sugar?
A.—Ultramarine and prussian blue, calcium, sulphate, chloride, invert sugar.

Q.—What is the Latin title for **Sugar of Milk?**
A.—Saccharum Lactis.

Q.—Give the official definition.
A.—Lactose ($C_{12}H_{22}O_{11} + H_2O$) obtained from the whey of cow's milk. Preserve it in tightly closed containers.

Q.—What is the real meaning of the term Lactose?
A.—Lac means "milk" and "ose" means sugar.

Q.—Why must it be preserved in closely covered containers?
A.—Because it readily absorbs odors.

Q.—How does its chemical formula differ from that of Sugar?
A.—Only by the addition of a molecule of Water.

Q.—Is it water-soluble?
A.—Yes, dissolves in 4.9 mils of water.

Q.—Is it alcohol-soluble?
A.—No.

Q.—Is it softer or harder than Sugar?
A.—Much harder.

Q.—Is it more or less sweet than Sugar?
A.—Less sweet.

Q.—How does it affect Fehling's Solution?
A.—Reduces it, but not so much as Glucosum.

Q.—What use is made of it in pharmacy?
A.—Used as a diluent where it is of especial value because of its hardness, for in reducing it to a fine state of division the other ingredients are finely comminuted.

Q.—Into what class of preparations does it enter largely?
A.—Triturations.

Q.—Is it laevo or dextrorotatory?
A.—Dextrorotatory +52.2 to 52.5.

GUMS

Q.—Name the two official gums.
A.—Acacia and Tragacanth.

Q.—Give the synonym for **Acacia.**
A.—Gum Arabic.

Q.—Give its official definition.
A.—The dried gummy exudation of Acacia Senegal and of other species of Acacia.

Q.—Is it water-soluble?
A.—Yes.

Q.—Is it alcohol-soluble?
A.—No.

Q.—What U. S. P. preparations are official?
A.—Mucilago 35%, Syrupus 10%.

Q.—Are the preparations stable?
A.—No, they rather quickly ferment.

Q.—How are Acacia solutions affected by Ferric Chloride T. S.?
A.—They form a gelatinous precipitate.

Q.—How are they affected by Basic Lead Acetate T. S.?
A.—Precipitated.

Q.—How are they affected by concentrated solution of Sodium Borate?

A.—Precipitated.

Q.—What is the principal constituent of Acacia?

A.—Arabin or calcium arabate.

Q.—How is Mucl. Acacia affected by alcoholics?

A.—Precipitated.

Q.—What principal use is made of it in pharmacy?

A.—Used as an emulsifying agent.

Q.—How does it affect Fehling's Solution?

A.—No effect.

Q.—Give the official definition for **Tragacanth.**

A.—The spontaneously dried gummy exudation from the stems of Astragalus gummifer or from other species of Asiatic Astragalus.

Q.—Is this a true gum?

A.—No.

Q.—Why is it not a true gum?

A.—Because it is not water-soluble.

Q.—What is it called to distinguish it from a true gum?

A.—A mucilage.

Q.—What is the principal constituent of Tragacanth?

A.—Bassorin.

Q.—Is this water-soluble?

A.—No, it is this principle which gives the characteristic insolubility to Tragacanth.

Q.—How does it act when treated with water?

A.—Swells to a gelatinous mass.

Q.—What adulterant is quite common?

A.—Indian gum.

Q.—How is it distinguished from Indian Gum?

A.—Boil a mixture of 1:20 until a mucilage forms, then add 5 mils hydrochloric acid and boil again for 5 minutes when no pink or red color should show.

Q.—What use is made of Tragacanth in pharmacy?

A.—Used as an emulsifying agent, as a mucilage, as a vehicle for nongreasy toilet preparations.

Q.—What U. S. P. preparation is official?
A.—Mucilago Tragacanthæ.

FERMENTATION PRODUCTS

Q.—What is the chemical name for **Alcohol?**
A.—Ethyl hydroxide.

Q.—What is the chemical formula?
A.—C_2H_5OH.

Q.—What is the source of ethyl alcohol?
A.—From starchy grains, usually corn.

Q.—Outline the progressive steps in the production of alcohol from grain.

A.—Grain is ground and allowed to digest with warm water at 88°C, which tends to convert the starch into maltose ($C_{12}H_{22}$-$O_{11} + H_2O$) according to this equation, $4C_6H_{10}O_5 + 2H_2O = C_{12}H_{22}O_{11}$; now the addition of malted barley through the agency of its active ferment brings about the complete change of the starch into maltose, the temperature having been reduced to 60° C. when the malt was added. Now the maltose hydrolyzes into dextrose. At this stage the saccharine solution is known as "wort." Temperature is now reduced to 18°C and yeast is added. The yeast causes the "wort" to ferment, forming alcohol and releasing carbon dioxide $C_6H_{12}O_6 + \text{yeast} = 2\ C_2H_5OH + 2\ CO_2$.

Q.—Why is the temperature reduced when the malted barley is added?

A.—The active constituent of malted barley is the ferment diastase which is destroyed at a temperature much above 60°C.

Q.—Why is the temperature reduced to 18°C., when the yeast is added?

A.—A high temperature destroys the yeast.

Q.—What is the percentage of alcohol in the mashed and fermenting mixtures?

A.—Never above 14%, as yeast can not live in stronger alcoholic fluid.

Q.—What impurities are found in freshly made alcohol?

A.—Amyl alcohol, glycerin, succinic acid, these are collectively known as fusel oil.

Q.—How is alcohol purified?
A.—By fractional and redistillation.

Q.—What further methods are used to remove more water and foreign odors from alcohol?
A.—Distillation from sodium manganate, anhydrous sodium acetate or freshly burned lime.

Q.—How many forms of alcohol are official?
A.—Three.

Q.—Name them and give strengths?
A.—

	By weight	By volume
Alcohol Dehydratum	99%	
Acohol	92.3%	94.9%
Alcohol Dilutum	41 to 42%	48.4 to 49.5%

Q.—At what temperature are these strengths taken?
A.—At 15.56°C.

Q.—What is the specific gravity of Alcohol?
A.—0.816 at 15.56° or 0.810 at 25°C.

Q.—What is the boiling point?
A.—78°C.

Q.—What peculiarity develops when equal volumes of alcohol and water are mixed?
A.—There is a contraction of about 3% by volume and a considerable rise in temperature.

Q.—What pharmaceutical use is made of Alcohol?
A.—It is a good solvent and preservative.

Q.—What is "**Proof Spirit**"?
A.—50% by volume of absolute alcohol and 50% water.

Q.—What is meant by the term "**Proof Gallon?**
A.—A term used in the Internal Revenue Service denoting a gallon of alcoholic liquid having 50% by volume of absolute alcohol. It is upon such a gallon that the revenue tax is based.

Q.—What is the relation between "proof degree" and "percentage of alcohol"?
A.—Two degrees proof equal 1% absolute alcohol.

Q.—What is "Cologne Spirit"?
A.—Alcohol which usually contains about 2% more of absolute alcohol than the commercial and is entirely free from foreign odors.

Q.—What use is made of it?

A.—It is used particularly for the manufacture of perfumes.

Q.—What is **denatured alcohol?**

A.—Alcohol which has been mixed with some specific material which will render it unfit for a beverage or for medicinal purposes but which still may be used in the arts and industries and for fuel, lights and power, in which condition it is free from revenue tax.

Q.—What agents are used to denaturize alcohol?

A.—Methyl alcohol, benzine and pyridine.

Q.—Is more than one formula used for such denaturing?

A.—Yes, several are permitted, depending upon what particular use is to be made of the alcohol.

Q.—Name some of the manufactured products made with denatured alcohol.

A.—Smoking and chewing tobacco; photo-engravings; fulminate of mercury; sulphomethane; purification of rubber; photographic collodions; imitation leather; transparent soap; ether for anesthesia.

Q.—Give the official definition for **Alcohol Dehydratum.**

A.—A liquid containing not less than 99% by weight of C_2H_5OH. Preserve it in well-closed containers, in a cool place, remote from fire.

Q.—What is its Specific Gravity?

A.—0.79 at 25°C.

Q.—How may it be prepared?

A.—By refluxing with freshly burned lime, then distilling.

Q.—What is the test for the presence of water?

A.—Shake 10 mils in a stoppered tube with 0.5 Gm. of anhydrous copper sulphate, no blue color should show.

Q.—What is the test for presence of alcohol?

A.—Add the liquid to Iodine T. S., make alkaline with KOH T. S. and allow to stand, if alcohol is present, particles of iodoform will show or if the alcohol is very small in quantity, the odor of iodoform will be noticeable.

Q.—What is the "proof degrees" of 94% alcohol?

A.—As each 1% of alcohol is equal to 2 degrees proof, 94% alcohol will be "188 proof".

Q.—Give the latin title for whiskey.
A.—Spiritus Frumenti.

Q.—What is its source?
A.—Made by fermentation of starchy materials, usually grains and subsequent distillation.

Q.—What technical name is applied to the fermenting mixture?
A.—The mash.

Q.—What is meant by the term "low wine"?
A.—The weak alcoholic liquid obtained in the first distillation.

Q.—What is meant by rectification?
A.—Distilling more than once, for the purpose of greater purity. That is, in the case of alcoholic liquors the elimination of more water and impurities, resulting in stronger alcoholic content.

Q.—What is the alcoholic content of whiskey?
A.—37 to 47.5% by weight, 44 to 55% by volume.

Q.—When rectification has been carried on until this percentage of alcohol is obtained, what is the product then called?
A.—Raw whiskey.

Q.—What color is it then?
A.—Quite colorless.

Q.—What is the color of commercial whiskey?
A.—Yellowish or amber.

Q.—To what is this color due?
A.—Said to be due to a trace of tannin derived from the oaken containers in which it is stored.

Q.—What age should whiskey be?
A.—At least four years.

Q.—Why is it required to age four years?
A.—It acquires mellowness, this is brought about by chemical changes in the liquor, the acids combining with alcohol and forming ethers and esters.

ALCOHOL DERIVATIVES

Q.—Give the official definition for Æther?
A.—A liquid containing not less than 95.5% nor more than 97.5% of ethyl oxide $(C_2H_5)_2O = 74.08$ the remainder consist-

ing of alcohol containing a little water. Preserve it in partially filled, well-closed containers, in a cool place, remote from fire and protected from daylight.

Q.—What precautions are directed when dispensing Æther for anesthesia?

A.—It should be dispensed in small, well-closed containers and the ether is not to be used if the container has been open for more than 24 hours.

Q.—What action does light have on it?

A.—Forms peroxides.

Q.—What incorrect name is frequently applied to Ether?

A.—Sulphuric ether.

Q.—Why is it so-called?

A.—Because sulphuric acid is used in the reaction.

Q.—How is it made?

A.—By mixing ethyl alcohol and sulphuric acid and distilling between 130° C and 140° C.

$$(1)\ C_2H_5OH + H_2SO_4 = C_2H_5HSO_4 + H_2O.$$

$$(2)\ C_2H_5HSO_4 + C_2H_5OH = (C_2H_5)_2O + H_2SO_4.$$

The apparatus is so regulated that a constant supply of alcohol is present at the time the ethyl sulphuric acid is formed and practically no sulphuric acid is lost except as it is diluted from the water which is formed in the reaction.

Q.—What is the chemical name for ether?

A.—Ethyl oxide.

Q.—What is its Specific Gravity?

A.—0.713 to 0.716.

Q.—What is its Boiling Point?

A.—About 35° C.

Q.—What is its solubility?

A.—Soluble in 12 times its volume of water, miscible with alcohol, chloroform, petroleum benzin, benzene or fixed or volatile oils.

Q.—What is its taste?

A.—Burning and sweetish.

Q.—Is it inflammable?

A.—Yes, dangerously so.

Q.—Is it explosive?
A.—Yes, when the vapor is mixed with air.

Q.—Is it volatile?
A.—Yes, very.

Q.—What is its pharmaceutical use?
A.—Used as a solvent.

Q.—What class of preparations is made with it?
A.—The pharmacopœial oleoresins.

Q.—What preparations are official?
A.—Spiritus Aetheris, Spt. Aetheris Compositus.

Q.—What therapeutic value does it have aside from anesthetic?
A.—Antispasmodic and carminative.

Q.—What is the dose?
A.—1 mil.

Q.—Into what class of N. F. preparations does it enter?
A.—The ethereal tinctures which are extracted with a menstruum of one volume of ether and two volumes of alcohol.

Q.—What is the test for aldehyde in Ether?
A.—Shake 10 mils of ether in a glass-stoppered cylinder protected from the light with 1 mil KOH T. S. and no color will develop unless aldehyde is present.

Q.—Give the official definition for **Oleum Æthereum.**
A.—A volatile liquid consisting of equal volumes of heavy oil of wine and ether.

Q.—How is it prepared?
A.—In a manner quite similar to ether, the difference being, that in case of ether, distillation is done at once, while with ethereal oil the mixture is allowed to macerate 24 hours before distillation.

Q.—What are the ingredients used in making it?
A.—Alcohol 100 volumes; Sulphuric acid 100 volumes; after standing 24 hours, this mixture is distilled, the product washed with distilled water and added to an equal volume of ether.

Q.—What is the product called that distils over from the mixture of alcohol and sulphuric acid?
A.—Heavy oil of wine.

Q.—At what temperature does the heavy oil of wine distil over?
A.—150° to 160° C.

Q.—What is heavy oil of wine chemically?
A.—Chiefly ethyl sulphate.

Q.—What use is made of ethereal oil?
A.—Used in making Compound Spirit of Ether.

Q.—What is the chemical name for nitrous ether?
A.—Ethyl nitrite.

Q.—How is nitrous ether prepared?
A.—Reaction between ethyl alcohol and sodium nitrite in the presence of sulphuric acid, according to the following reaction.

(1) $C_2H_5OH + H_2SO_4 = C_2H_5HSO_4 + H_2O$.

(2) $C_2H_5HSO_4 + NaNO_2 = C_2H_5NO_2 + NaHSO_4$.

Q.—How is nitrous ether official?
A.—As **spirit of nitrous ether.**

Q.—What strength?
A.—4% of absolute ethyl nitrite.

Q.—In making the spirit according to the pharmacopœia monohydrated sodium carbonate is used to wash the ethyl nitrite. Why is it used?
A.—To neutralize any acid present.

Q.—Why is the ethyl nitrite washed with cold water?
A.—To remove any undecomposed alcohol.

Q.—Why is dried potassium carbonate used?
A.—To remove the last traces of water.

Q.—Does the spirit keep well?
A.—No.

Q.—How should it be stored?
A.—In well-closed amber-colored bottles, protected from the light and kept in a cool place.

Q.—How does the spirit decompose?
A.—Light will cause the ethyl nitrite to break down into alcohol and acids, nitrous and nitric, then with the presence of a small amount of acid the decomposition goes on more rapidly.

Q.—What measures are adopted to retard decomposition?

A.—A little potassium bicarbonate is often added to the shelf bottle. This is alkaline and tends to neutralize the acid as fast as formed.

Q.—What is the Spirit therapeutically?

A.—Diuretic, diaphoretic, antispasmodic.

Q.—What is the dose?

A.—2 mils.

Q.—Outline the pharmacopœial assay process for ethyl nitrite.

A.—A nitrometer is used which is partially filled with a saturated solution of sodium chloride. A definite quantity of the Spirit is first introduced, this is followed by solution of potassium iodide, then by normal volumetric solution of sulphuric acid. The reaction releases NO, the volume of which is read and the weight of ethyl nitrite calculated. The following equation shows the reaction:

$$C_2H_5NO_2 + KI + H_2SO_4 = C_2H_5OH + KHSO_4 + I + NO.$$

Q.—What is the sulphuric acid in the process for?

A.—It forms hydriodic acid and nitrous acid, the hydriodic decomposing the nitrous acid with the liberation of NO.

Q.—Why is the saturated solution of salt used?

A.—Because it does not absorb the gas as water would.

Q.—How is the percentage of ethyl nitrite calculated?

A.—The mil equivalent given in the U. S. P. is 0.00307 Gm. This equivalent is multiplied by the number of mils of the gas NO which is shown in the nitrometer. This gives the weight of ethyl nitrite contained in the weight of Spirit which was placed in the nitrometer, hence the weight of ethyl nitrite divided by the weight of spirit and multiplied by 100 gives the percentage of ethyl nitrite.

Q.—Give the official definition for **Æther Aceticus.**

A.—A liquid containing not less than 96% by volume of $CH_3CO.OC_2H_5$, the remainder consisting of alcohol and a little water. Preserve it in well-stoppered bottles, in a cool place, remote from fire and protected from the light.

Q.—How is it made?

A.—By reaction between ethyl alcohol, sodium acetate in the presence of sulphuric acid.

$$(1)\ C_2H_5OH + H_2SO_4 = C_2H_5HSO_4 + H_2O.$$

$$(2)\ C_2H_5HSO_4 + NaC_2H_3O_2 = C_2H_5C_2H_3O_2 + NaHSO_4.$$

Q.—What is its solubility?
A.—Soluble in 10 mils of water, miscible in all proportions with alcohol.

Q.—What is it therapeutically?
A.—Antispasmodic.

Q.—What use is made of it in pharmacy?
A.—Used as a flavoring agent.

Q.—Is it inflammable?
A.—Yes.

Q.—What is the dose?
A.—1 mil, or 15 minims.

Q.—How is **Ethyl Chloride** prepared?
A.—By the action of hydrochloric acid gas on absolute ethyl alcohol.

Q.—By what other name is it sometimes called?
A.—Hydrochloric ether.

Q.—What is its chemical name?
A.—Mono-chlor-ethane, C_2H_5Cl.

Q.—Describe it.
A.—A colorless, mobile, very volatile liquid having an agreeable odor and a burning taste.

Q.—How should it be kept?
A.—In hermetically sealed tubes.

Q.—How soluble is it?
A.—Slightly soluble in water, readily soluble in alcohol.

Q.—What is its boiling point?
A.—12.5 to 13° C.

Q.—Is it inflammable?
A.—Yes, very and it should not be used near a flame.

Q.—What impurity may be present?
A.—Hydrochloric acid.

Q.—How is its presence demonstrated?
A.—1 mil of the cold ethyl chloride is dissolved in 20 mils of alcohol and a few drops of silver nitrate T. S. added when a white turbidity indicates the presence of hydrochloric acid.

Q.—Under what trade name is ethyl chloride marketed?
A.—Kelene.

Q.—What is its therapeutic use?
A.—Local anesthesia.

Q.—Is it ever used as a general anesthetic?
A.—Not by itself but in combination with other agents.

Q.—What is "anoesthol"?
A.—A general anesthetic composed of 17 Gm. ethyl chloride, 36 Gm. chloroform, 48 Gm. ether.

Q.—What is "somnoform"?
A.—A general anesthetic used particularly in dentistry and composed of 60 parts ethyl chloride, 35 parts methyl chloride and 5 parts ethyl bromide.

Q.—How is ethyl chloride used?
A.—It is sprayed onto the part which it is desired to anesthetize, the liquid is converted into vapor by abstracting the heat from the part causing it to practically freeze. This is indicated by a peculiar whiteness and at this time the incision is made.

Q.—Give the official definition for **Æthylis Chloridum.**
A.—Monochlorethane (C_2H_5Cl). Preserve it in hermetically sealed containers, in a cool place, remote from fire and protected from light.

Q.—Describe **Æthylis Carbamas.**
A.—Colorless, columnar crystals, or scales, odorless and having a cool, saline taste.

Q.—Is it soluble?
A.—Yes, in less than one part of water, 0.6 part alcohol.

Q.—What is it therapeutically?
A.—Hypnotic.

Q.—By what common name is it called?
A.—Urethane.

Q.—What is the dose?
A.—1 Gm.

Q.—What is "euphorin"?
A.—Ethyl phenylcarbamate. Phenylurethane.

Q.—What is it therapeutically?

A.—Analgesic; antipyretic; antiseptic; antirheumatic.

Q.—Give the official definition for Æthylis Carbamas.

A.—The ethyl ester ($C_3H_7O_2N$ or $CO\cdot(OC_2H_5)NH_2$) of carbamic acid. Preserve it in well-closed containers.

Q.—What is its English name?

A.—Ethyl carbamate.

Q.—What is the strength of **Amyl Nitrite?**

A.—80% of amyl nitrite.

Q.—How is it prepared?

A.—Usually by the action of amyl alcohol on sodium nitrite in the presence of sulphuric acid.

(1) $C_5H_{11}OH + H_2SO_4 = C_5H_{11}HSO_4 + H_2O.$

(2) $C_5H_{11}HSO_4 + NaNO_2 = C_5H_{11}NO_2 + NaHSO_4.$

Q.—How should it be preserved?

A.—In hermetically sealed glass bulbs or in dark amber-colored glass-stoppered vials in a cool and dark place.

Q.—Describe it.

A.—A clear, yellowish liquid, of a peculiar fruity odor and a pungent aromatic taste.

Q.—What can you say of its solubility?

A.—Almost insoluble in water, miscible in all proportions of alcohol.

Q.—What is it therapeutically?

A.—Vasodilator and motor depressant.

Q.—In what particular trouble is it mostly used?

A.—Asthma, for the relief of spasm-like seizures.

Q.—How is it usually administered?

A.—A small glass bulb of amyl nitrite called a "pearl" is crushed in a handkerchief and inhaled.

Q.—What is the dose?

A.—0.2 Cc.

Q.—How is **nitroglycerin** made?

A.—By dropping glycerin into a cold mixture of nitric and sulphuric acids.

Q.—By what other names is it known?
A.—Glonoin and trinitrin.

Q.—What is dynamite?
A.—1 part of nitroglycerin mixed with 3 parts of infusorial earth (kieselguhr).

Q.—What preparation of nitroglycerin is official?
A.—The spirit.

Q.—What is the strength of the spirit?
A.—1%.

Q.—How should the spirit be stored?
A.—Preferably in tin cans, in a cool place away from lights and fire.

Q.—What is the objection to storing it in bottles?
A.—The glass is easily cracked or broken and the alcohol would quickly evaporate, leaving the very explosive nitroglycerin.

Q.—If in handling spirit of nitroglycerin, a quantity is accidentally spilled, what should be done?
A.—At once pour onto it a solution of potassium hydroxide to neutralize it and decompose it.

Q.—What is it therapeutically?
A.—A vasodilator.

Q.—What is the dose?
A.—0.05 Cc.

Q.—Give the official for **Methylis Salicylas.**
A.—It contains not less than 98% of $CH_3C_7H_5O_3$. It is produced synthetically or is obtained by distillation from Gaultheria procumbens or from Betula lenta. The label must indicate whether the methyl salicylate has been made synthetically or distilled from either of the above-mentioned plants. Preserve it in well-stoppered, amber-colored bottles in a cool place, protected from the light.

Q.—Describe it.
A.—It is colorless, yellowish or reddish liquid having the characteristic odor and taste of gaultheria.

Q.—What can you say of its solubility?
A.—Sparingly soluble in water; miscible with alcohol and glacial acetic acid. Soluble in 6 volumes of 70% alcohol.

Q.—What is the Boiling Point?
A.—218° to 221° C.

Q.—How does the Specific Gravity range?
A.—Synthetic 1.18 to 1.185, from sweet birch or gaultheria 1.172 to 1.182.

Q.—How does it affect the plane of polarized light?
A.—The synthetic or that obtained from sweet birch is inactive but that obtained from gaultheria turns the plane to the left not more than 1.5° in a 100 mm. tube.

Q.—How is it made?
A.—By heating methyl alchol with salicylic acid in the presence of sulphuric acid.

Q.—What is it therapeutically?
A.—Antirheumatic.

Q.—What is the dose?
A.—0.75 mil.

Q.—What U. S. P. VIII substances does it replace?
A.—Oleum Gaultheria, Oleum Betula, Oil of teaberry.

ALDEHYDES—DERIVATIVES

Q.—Give the official definition for **Paraldehydum.**
A.—A polymer $(CH_3CHO)_3$ of acetaldehyde. Preserve it in well-closed containers, in a cool place, protected from the light.

Q.—Describe it.
A.—A colorless transparent liquid having a strong characteristic but not unpleasant or pungent odor, producing first a burning then a cooling sensation in the mouth.

Q.—What is its solubility?
A.—8 parts of cold water, but 17 parts of boiling water.

Q.—What is it therapeutically?
A.—Hypnotic.

Q.—What is the dose?
A.—2 mils.

Q.—May it be solidified?
A.—Yes, it becomes solid at 0° C but liquefies at 10.5° C.

Q.—Give the official definition for **Chloralum Hydratum.**

A.—A compound of trichloraldehyde or chloral with the elements of one molecule of water. It contains not less than 99.5% of $C_2HCl_3O + H_2O$. Preserve it in a tightly-stoppered bottle in a cool place protected from the light.

Q.—How is it made?

A.—By passing dry chlorine gas into absolute alcohol as long as the chlorine is readily taken up. The mixture is then heated to 60° or 70° C. and mixed with sulphuric acid, this decomposes the chloral alcoholate which has formed, the crude chloral separates and is distilled from lime or chalk. This rectified chloral is weighed and mixed with a calculated weight of water, then poured onto plates of glass, covered with a bell-glass and allowed to crystallize.

Q.—Is it soluble?

A.—Yes, readily soluble in all common solvents.

Q.—How does it act when triturated with camphor?

A.—It forms a liquid.

Q.—Does it act this way with any other substances?

A.—Yes, menthol, thymol, phenol and others.

Q.—How is Hydrated Chloral affected by alkalies?

A.—It is decomposed into chloroform and the formate of the alkali used.

Q.—How does it behave with Alcohol?

A.—It forms chloral alcoholate which is quite potent and only slightly soluble in water.

Q.—Describe Hydrated Chloral.

A.—It occurs in rhomboidal, colorless, transparent crystals which do not readily attract moisture. It slowly volatilizes when exposed to the air.

Q.—What is it therapeutically?

A.—Hypnotic and local anesthetic.

Q.—What is the dose?

A.—0.5 Gm.

Q.—How is it assayed?

A.—By titration with KOH V. S. depending upon the decomposition of the chloral into potassium formate.

Q.—What preparations are official?

A.—Chloral-Camphoratum, 50% N. F.

Mist. Chlorali et Potass. Brom. Comp. 20%.

Q.—Give the official definition for **Trichloracetic Acid.**

A.—A monobasic organic acid. It contains when dried to constant weight in a desiccator over sulphuric acid not less than 99% of CCl_3COOH. Preserve it in well-stoppered bottles in a cool place protected from the light.

Q.—Describe it.

A.—It is solid, colorless, deliquescent, rhombohedral crystals. Slight taste and characteristic odor.

Q.—What is its chemical formula?

A.—CCl_3COOH.

Q.—How is it made?

A.—By oxidizing hydrated chloral with fuming nitric acid. The chloral hydrate is fused and the nitric acid added, then set aside until red fumes cease to form. It is then carefully distilled and that portion coming over above 190° C is pure trichloracetic acid and is collected separately.

Q.—Is it soluble?

A.—Yes, easily soluble in water, alcohol and ether.

Q.—What use is made of it therapeutically?

A.—Used as a cauterizing agent.

Q.—What forms when it is heated with KOH T. S.?

A.—Chloroform and K_2CO_3.

Q.—Give the official definition for **Chloroform.**

A.—A liquid consisting of not less than 99% or more than 99.4% by weight of $CHCl_3$, and not less than 0.6% or more than 1% of alcohol. Preserve in well-stoppered bottles, in a cool place protected from the light.

Q.—What caution is directed regarding the vaporizing of Chloroform?

A.—A naked flame will cause the formation of noxious gases.

Q.—What is its chemical formula?

A.—$CHCl_3$.

Q.—What is its chemical name?

A.—Trichlormethane.

Q.—How is chloroform made?

A.—By distilling a mixture of alcohol, chlorinated lime and water. Purified with sulphuric acid, washed with water and a solution of sodium carbonate and finally dehydrated with fused calcium chloride.

Q.—What other method is used?

A.—Reaction between acetone and chlorinated lime, then decomposition of the product with hydroxide.

Q.—Which reaction is used commercially?

A.—The one with acetone.

Q.—Why is it used?

A.—Because of the much larger yield of chloroform as compared with the alcohol method.

Q.—Why does the U. S. P. require from 0.6% to 1.% of alcohol in the chloroform?

A.—Because chloroform when absolutely pure decomposes rather quickly, the oxygen of the air converting it to HCl and $COCl_2$. The alcohol retards such reaction.

Q.—Describe chloroform.

A.—It is a clear, colorless, mobile liquid, having a characteristic, ethereal odor and burning, sweetish taste.

Q.—Is it water-soluble?

A.—210 parts of water (volume).

Q.—Is it soluble in the organic solvents?

A.—Yes.

Q.—What is its Specific Gravity?

A.—1.474 to 1.478 at 25° C.

Q.—Is it volatile?

A.—Yes, quite so.

Q.—Is it inflammable?

A.—No.

Q.—What is its Boiling Point?

A.—61° C.

Q.—How would you test it for the presence of free HCl?

A.—Add a few drops of silver nitrate T. S. to a little chloroform in a test tube and if HCl is present a curdy white precipi-

tate will form which is insoluble in nitric acid but soluble in very dilute ammonia water.

Q.—How would you test it for the presence of free Chlorine?
A.—Add a few drops of potassium iodide T. S. to a little chloroform in a test-tube, together with a few drops of starch T. S. and if Chlorine is present a blue color will develop because of the chlorine having liberated iodine from the potassium iodide T. S.

Q.—What use is made of chloroform therapeutically?
A.—Anesthetic, antispasmodic.

Q.—What precaution must be taken when administering as an anesthetic?
A.—Must not be administered under a naked flame for the flame will convert it to $COCl_2$ which is poisonous.

Q.—What is the internal dose?
A.—0.3 mil.

Q.—Give the official definition for **Bromoform.**
A.—A liquid consisting of about 96% by weight of $CHBr_3$ and about 4% of dehydrated alcohol. Preserve it in glass-stoppered bottles, in a cool place, protected from light.

Q.—What is the chemical name of Bromoform?
A.—Tribrommethane.

Q.—What is its chemical formula?
A.—$CHBr_3$.

Q.—How is it made?
A.—Reaction between potassium bromide, chlorinated lime and acetone.

Q.—Describe it.
A.—A heavy, transparent, colorless mobile liquid, with an ethereal odor and a penetrating, sweet taste resembling that of chloroform.

Q.—What is its specific gravity?
A.—2.60.

Q.—What can you say of its solubility?
A.—Slightly soluble in water, miscible with all other organic solvents.

Q.—What is it used for?
A.—Antispasmodic in whooping-cough.

Q.—What is the dose?
A.—0.2 mil.

Q.—How many drops in 1 fl. dr. Bromoform?
A.—360.

Q.—Give the official Latin title for **Sulphonal.**
A.—Sulphonmethanum.

Q.—What is the chemical name?
A.—Diethylsulphonedimethylmethane.

Q.—How should it be stored?
A.—In well-closed containers.

Q.—How soluble is it?
A.—1 Gm. dissolves in 365 mils of water.

Q.—What is the best solvent for it?
A.—Chloroform.

Q.—What is its melting point?
A.—125° C.

Q.—What is it therapeutically?
A.—Hypnotic.

Q.—What is the dose?
A.—0.75 Gm.

Q.—How should it be administered?
A.—With hot milk or hot water.

Q.—Why is it administered in this way?
A.—To dissolve more quickly.

Q.—How long after administration may the effect be looked for?
A.—In an hour or more.

Q.—Give the official title for **Trional.**
A.—Sulphonethylmethanum.

Q.—What is the chemical name?
A.—Diethylsulphonemethylethylmenthanum.

Q.—How should it be preserved?
A.—In well-closed containers.

Q.—How soluble is it?
A.—Dissolves in 200 parts of water.

Q.—What is its melting point?
A.—75° C.

Q.—What decomposition product is evolved when it is decomposed by heat?
A.—Sulphur dioxide.

Q.—What is it therapeutically?
A.—Hypnotic.

Q.—What is the dose?
A.—0.75 Gm.

Q.—Why is it preferred to Sulphonal?
A.—Being more soluble it acts more quickly and it is said to be less depressant.

Q.—What is **Vanillinum** chemically?
A.—An aldehyde.

Q.—Give the definition.
A.—Methylprotocatechuic aldehyde occurring naturally in vanilla or prepared synthetically. Preserve in well-closed containers protected from the light.

Q.—How is it prepared synthetically?
A.—By the oxidation of eugenol with potassium permanganate.

Q.—What use is made of it?
A.—Used as a flavoring agent.

Q.—How soluble is it?
A.—Dissolves in 100 parts of water, soluble in most of the organic solvents.

WINES

Q.—Name the two classes of Wines.
A.—White and red wines.

Q.—How are wines made?
A.—By fermenting the juices of fruits, mostly those of grapes.

Q.—What causes the difference between red and white wine?
A.—White wine is made from white grapes, or from red grapes which have been deprived of their stems, seeds and skins.

Q.—What is the principal constituent of the coloring matter?
A.—Tannin.

Q.—What is the "must" of wine?
A.—The crude juice which is run into vats to ferment.

Q.—What is meant by a "dry" wine?
A.—One in which all the sugar has been converted to alcohol.

Q.—What causes a sour wine?
A.—Presence of a large amount of ferment which converts some of the alcohol into acetic acid.

Q.—What is the official wine?
A.—**Vinum Xericum.**

Q.—What is the English name?
A.—Sherry wine.

Q.—Is it a white or red wine?
A.—A white wine.

Q.—Give the official definition.
A.—An alcoholic liquid made by fermenting the juice of fresh, ripe grapes, the fruit of cultivated species of Vitas, freed from stems, seeds and skins and fortifying with pure grape brandy. It contains not less than 16% nor more than 24% of C_2H_5OH by volume, when estimated as directed in the U. S. P. IX. Preserve it in well closed casks, or in well-stoppered bottles, in a cool place.

Q.—What is the source of **Tartaric Acid?**
A.—Obtained from argols which are found as deposits in wine casks.

Q.—What are argols chemically?
A.—Principally potassium and calcium tartrate.

Q.—What is the chemical formula for Tartaric acid?
A.—COOH. CHOH. CHOH. COOH: $H_2C_4H_4O_6$.

Q.—How is the acid prepared?
A.—The argols are converted into calcium tartrate by the use of chalk and then decomposed by dilute sulphuric acid which forms a precipitate of calcium sulphate and a solution of tartaric acid. The calcium sulphate is filtered out and the tartaric acid obtained by evaporation of the water.

Q.—Give the official definition.
A.—A dibasic organic acid usually obtained from wine lees or argol. It contains not less than 99.5% of $C_4H_6O_6$.

Q.—What is the solubility of tartaric acid?
A.—Dissolves in 0.75 mil of water, 3.3 mils of alcohol, slightly soluble in ether.

Q.—What is the odor given off when burned?
A.—Like that of burning sugar.

Q.—What is it therapeutically?
A.—Refrigerant.

Q.—What is the dose?
A.—0.5 Gm.

Q.—Give the official definition for **Acidum Citricum.**
A.—A tribasic organic acid usually obtained from the juice of limes or lemons. It contains not less that 99.5% $C_3H_4(OH)(COOH)_3 + H_2O$. Preserve it in well-closed containers.

Q.—What is the method of preparation?
A.—The concentrated lemon or lime juice is treated with chalk or milk of lime to form calcium citrate and all impurities removed, the calcium citrate being less soluble in hot than cold water. The calcium citrate is then decomposed by sulphuric acid, calcium sulphate precipitates, the citric acid remains in solution and is then obtained by evaporation.

Q.—In what other manner may it be produced?
A.—By the action of a fungus called citromyces on grape-sugar.

Q.—What is the solubility of citric acid?
A.—0.5 mil water, 1.8 mils alcohol, 30 mils ether.

Q.—What is it therapeutically?
A.—Refrigerant, antiscorbutic, flavoring agent.

Q.—What is the dose?
A.—0.5 Gm.

Q.—What effect does the air have on it?
A.—Causes it to lose its water of crystallization.

Q.—How does it differ from Tartaric acid?
A.—More soluble in ether, does not give odor of burning sugar.

OLEA PINGUA—FIXED OILS

Q.—What is the Latin name for Fixed Oils?
A.—Olea Pingua.

Q.—Why are they called "fixed" oils?

A.—Because they can not be volatilized by heat without decomposition.

Q.—What is the source of Fixed Oils?

A.—They are obtained from both the animal and vegetable kingdoms.

Q.—How are they obtained?

A.—Those from the vegetable sources are generally obtained by grinding the vegetable substance then subjecting it to hydraulic pressure between iron plates which are sometimes heated. Those from animal source are obtained by melting the tissue which contains the fat, either by itself or with water then skimming off the oil or straining it.

Q.—How are fixed oils purified?

A.—They are heated and filtered through flannel or felt.

Q.—How are they bleached?

A.—By treating with dilute sulphuric acid then filtering. (b) Filtration through animal charcoal. (c) Direct exposure to sunlight. This, however, frequently causes them to become rancid. (d) Some are treated variously with permanganic acid, chromic acid, sulphur dioxide or hypochlorites.

Q.—What are the fixed oils chemically?

A.—They are esters, compounds of glycerin and oleic, palmitic and stearic acids.

Q.—What names are given to the three principal constituents of fixed oils?

A.—Olein, palmitin and stearin.

Q.—What are these chemically?

A.—Olein is glyceryl oleate, palmitin is glyceryl palmitate and stearin is glyceryl stearate.

Q.—Which one of these gives greatest fluidity to oils?

A.—Olein.

Q.—Which one gives greatest solidity?

A.—Stearin.

Q.—What distinguishes fats from oils?

A.—If it is solid at room temperature it is a fat, if fluid it is an oil.

Q.—What official exception to this rule?
A.—Oil of theobroma is solid at room temperature.

Q.—How do the specific gravities of the fixed oils run?
A.—They are all less than one.

Q.—What can you say of their solubilities?
A.—They are insoluble in water, practically insoluble in alcohol with two exceptions. Soluble in ether, chloroform and benzin.

Q.—How are they affected by Iodine?
A.—They all absorb Iodine.

Q.—What is the explanation of their absorbing Iodine?
A.—They all contain more or less olein, oleic acid is an unsaturated compound, that is there is a double bond between two of the carbon atoms and one of these will break open at any opportunity and add on other elements, this is what is done when the iodine is absorbed.

Q.—How are they affected by alkalies?
A.—They are saponified, that is, they form soap and glycerin.

Q.—What is meant by the **Iodine Number** of a fixed oil?
A.—The number of Grams of Iodine which 100 Gm. of the fat will absorb.

Q.—What is another name for the Iodine Number?
A.—Huebel number.

Q.—What is meant by the **Saponification Number** of a fixed oil or fat?
A.—The number of milligrams of absolute KOH which are absorbed by 1 Gm. of the fat or fixed oil.

Q.—What is another name for Saponification Number?
A.—Koettstorfer number.

Q.—How is this test carried out?
A.—Approximately 1 Gm. of the fat is accurately weighed into a flask, then a definite quantity as 25 mils of N/2 Alcoholic KOH V. S. is accurately measured in from a burette. The mixture is then allowed to simmer on a water-bath for half an hour when complete saponification has resulted. Now the excess of KOH is titrated with N/2 HCl V. S. and the amount absorbed by the fat determined. Multiply the number of mils of KOH

consumed by 28.055, then divide by the number of Gm. of the fat which gives the milligrams of KOH absorbed.

Q.—If 2.8 Gm. of fat is treated with 25 Mils N/2 KOH V. S. and it requires 9 mils of N/2 HCl to neutralize the unabsorbed alkali, what is the Saponification Number of the fat?

A.—$25 - 9 = 16$, $16 \times 28.055 = 448.88$, $448.88 \div 2.8 = 160$.

Q.—How do fats decompose?

A.—They become rancid.

Q.—What is rancidity?

A.—A breaking down of the oil with the liberation of free acid.

Q.—What will cause rancidity?

A.—Presence of moisture, heat, exposure to the air.

Q.—What adulterations are found in fixed oils?

A.—Rosin oil, fish oil, liquid petrolatum and other cheaper fixed oils.

Q.—How should the oils be stored?

A.—In a dry, shaded, cool place of uniform temperature in a well-closed container.

Q.—Into what three general groups are the fixed oils divided?

A.—Drying, intermediate and non-drying.

Q.—What is the chemical test for distinguishing between drying and non-drying oils?

A.—When treated with nitrous acid the non-drying oils solidify while the drying are unchanged.

Q.—What is the reason for this solidification?

A.—The acid is an oxidizing agent; the non-drying oil contains a considerable quantity of olein, this is oxidized to elaidin.

Q.—What are these two substances chemically?

A.—Olein is a compound of the glyceryl and oleic acid radicals. Elaidic acid is an isomer of oleic acid, and elaidin is a compound of glyceryl and elaidic acid radicals. The action of nitrous acid is to oxidize the oleic acid compound to its isomer which is solid.

Q.—Name the typical drying oil.

A.—Oleum Lini, linseed oil, flaxseed oil.

Q.—Give the official definition for **Oleum Lini.**

A.—A fixed oil obtained from Linseed. Preserve it in well-stoppered containers. Linseed oil which has been "boiled" must not be used nor dispensed.

Q.—What are the two kinds of linseed oil found on the market?

A.—Raw oil and boiled oil.

Q.—Which is the one to be used in medicine and pharmacy?

A.—The raw oil.

Q.—What is the significance of the quotation marks about the word boiled in the definition?

A.—It is a matter of common knowledge that the oil is no longer actually boiled but is treated chemically with lead and manganese salts, which shows why this oil must not be dispensed.

Q.—Why is it "boiled"?

A.—To make it dry more quickly.

Q.—When is it desirable to have it dry quickly?

A.—When it is used for painting.

Q.—What is the test for the presence of non-drying oils?

A.—Spread a thin layer on a piece of glass and set in a warm place, it is gradually converted into a hard, transparent resin.

Q.—What are the adulterants which may be found in it?

A.—Mineral oil, rosin, and rosin oil.

Q.—What tests are used for their detection?

A.—Saponification with KOH and alcohol, the mineral oil will not saponify but will show in fine oily drops. Treatment with glacial acetic and sulphuric acids will produce a violet color if rosin or rosin oil is present.

Q.—What is it therapeutically?

A.—Laxative and demulcent.

Q.—What is the dose?

A.—30 mils.

Q.—Name the official non-drying oils.

A.—Oleum Amygdalæ Expressum, Oleum Olivæ.

Q.—Give the official definition for **Oleum Amygdalæ Expressum.**

A.—A fixed oil obtained from the kernels of varieties of Prunus Amygdalus. Preserve in well-closed containers in a cool place.

Q.—What is the synonym for this oil?
A.—Oil of Sweet Almond.

Q.—What kind of almonds is it usually obtained from commercially?
A.—Usually from bitter almonds.

Q.—Do they yield a larger quantity?
A.—No, a less quantity generally.

Q.—Why are they used?
A.—Because after the fixed oil has been expressed, the crushed seeds may be mixed with water and a quantity of volatile oil of almond obtained.

Q.—What is the most common adulterant of the fixed oil?
A.—Oil of peach or apricot kernels.

Q.—What is the test for these?
A.—Treat with fuming nitric acid and water, then allow to stand for several hours, a white mass will develop which turns red if these are present.

Q.—How is lard oil or olive oil detected?
A.—Almond oil will remain clear at –10° C and will not congeal until nearly –20° C.

Q.—What is it therapeutically?
A.—Demulcent and nutritive.

Q.—What very popular preparation does this enter?
A.—Unguentum Aquæ Rosæ. Cold Cream.

Q.—Give the official Latin title for **Olive Oil.**
A.—Oleum Olivæ.

Q.—Give the official definition.
A.—A fixed oil obtained from the ripe fruit of Olea Europæa. Preserve it in well-closed containers in a cool place.

Q.—What color is it?
A.—From a pale yellow to a light greenish-yellow.

Q.—How is the best grade obtained?
A.—By cold expression of the ripe fruit.

Q.—What name is given to a poorer grade made from the unripe fruit?
A.—Malaga oil.

Q.—What color is it?
A.—Quite green.

Q.—What common adulterant?
A.—Cottonseed oil. Sesame oil.

Q.—What is the test for the presence of cottonseed oil?
A.—Mix 5 mils of the oil in a test tube with 5 mils of a mixture of equal volumes of CS_2 and amyl alcohol which contains 1% of sulphur in solution, immerse the test tube to 1/3 its depth in boiling saturated solution of sodium chloride, if cottonseed oil is present a reddish color will develop within 15 minutes.

Q.—What is the test for the detection of sesame oil?
A.—Mix 2 mils of the oil with 1 mil of hydrochloric acid containing 1% of sugar, shake the mixture for half a minute then allow it to stand for 5 minutes; on now adding 3 mils of distilled water and shaking again the acid layer will show a pink color if sesame oil is present.

Q.—What is the oil therapeutically?
A.—Nutritive, laxative and emollient.

Q.—What is the dose?
A.—30 mils.

Q.—What is Sweet Oil?
A.—The courts have ruled that nothing but Olive Oil may be sold for Sweet Oil.

Q.—Name some of the official compounds and preparations which Olive Oil enters.
A.—Sapo, Oleates, Phenolated Oil, Compound Liniment of Croton Oil.

Q.—Give the Latin title for the official from the Fish Oil Group.
A.—Oleum Morrhuæ.

Q.—What is the synonym?
A.—Oleum Jecoris Aselli.

Q.—Give the official definition.
A.—A fixed oil obtained from the fresh livers of Gadus morrhua and of other species of Gadus. Preserve it in well-closed containers, in a cool place, the containers having been thoroughly dried before filling.

Q.—What rather uncommon solvent does the U. S. P. mention for Cod Liver Oil?

A.—Ethyl Acetate.

Q.—Name the different grades of Oil sent into market.

A.—Shore oil, Straits oil, Banks oil.

Q.—How is the oil obtained?

A.—By simply exposing the livers to the sun which causes the oil to exude; by slowly heating on a steam bath; by boiling with water and skimming off the separated oil.

Q.—Which is the best grade?

A.—That made without the use of artificial heat.

Q.—What is said to be the valuable constituent of the oil?

A.—The unsaturated fatty acids.

Q.—Is there any medicinal value in the "so-called" active constituents of the oil?

A.—No.

Q.—How are these usually obtained?

A.—By shaking the oil thoroughly with alcohol, separating the alcoholic layer, then distilling off the alcohol and collecting the residue.

Q.—What halogen is the oil said to contain in small quantities?

A.—Iodine.

Q.—In what particular disease is Cod Liver Oil largely used?

A.—Tuberculosis.

Q.—How is it of value?

A.—It is of value because of its food-value, that is if the patient can digest it, it improves his powers of resistance to the tuberculosis bacillus.

Q.—In what form is it most generally prescribed?

A.—In emulsion flavored with volatile oils.

Q.—What percentage of oil do these emulsions contain?

A.—50%.

Q.—What is the oil therapeutically?

A.—Nutritive in wasting diseases and demulcent.

Q.—What is the dose?

A.—10 mils.

Q.—What two vegetable oils in the intermediate group?
A.—Cottonseed oil and sesame oil.

Q.—What is the Latin title for **Cottonseed Oil?**
A.—Oleum Gossypii Seminis.

Q.—What is the official definition?
A.—A fixed oil obtained from the seeds of cultivated varieties of Gossypium herbaceum or of other species of Gossypium. Preserve it in well-closed containers.

Q.—Is it an edible oil?
A.—Yes, many oils called salad-oils are only cotton-seed oil.

Q.—What are its therapeutic properties?
A.—Demulcent and laxative.

Q.—What is the Latin title for **Sesame Oil?**
A.—Oleum Sesami.

Q.—What are the synonyms?
A.—Teel oil, Benne oil.

Q.—What is the official definition?
A.—A fixed oil obtained from the seeds of one or more cultivated varieties of Sessamum indicum. Preserve in well-closed containers.

Q.—In what official preparations is it used?
A.—Liniment of Ammonia and the Infused Oils.

Q.—What oils make up the Castor Oil Group?
A.—Castor oil and croton oil.

Q.—In what respects do they differ from the other oils?
A.—They are quite readily soluble in alcohol and have decided purgative properties.

Q.—What is the Latin title for **Castor oil?**
A.—Oleum Ricini.

Q.—Give the official definition.
A.—A fixed oil obtained from the seeds of Ricinus communis. Preserve it in well-closed containers.

Q.—How is the best quality of castor oil obtained?
A.—By cold expression of the seed.

Q.—Point out three solubility features in which it differs from most other fixed oils.

A.—It is soluble in alcohol and in glacial acetic acid and not completely soluble in petroleum benzin.

Q.—What poisonous constituent does it contain?

A.—Ricin.

Q.—What is the objection to the continued use of castor oil as a laxative.

A.—It is said to produce hemorrhoids.

Q.—What is the dose?

A.—15 mils.

Q.—What other form of castor oil is official?

A.—Oleum Ricini Aromaticum.

Q.—Why is this form official?

A.—To mask the nauseating taste of the oil.

Q.—Give the Latin title for **Croton oil.**

A.—Oleum Tiglii.

Q.—Give the official definition.

A.—A fixed oil expressed from the seeds of Croton Tiglium. Preserve it in small, well-stoppered bottles, protected from the light.

Q.—Is it more or less soluble in alcohol than castor oil?

A.—Less soluble but the solubility increases with age.

Q.—What action does it have aside from purgative?

A.—It is strongly irritant, and applied to the skin will blister.

Q.—What is the internal dose?

A.—0.05 mil.

Q.—How is it administered?

A.—May be made into pills by the use of bread-crumb or emulsified with some bland oil.

Q.—What is the treatment for poisoning by Croton oil?

A.—Give oils, mucilage, milk or solution of gelatin to allay inflammation, and opium to relieve the pain. If collapse occurs apply external heat and give strychnine as a stimulant.

Q.—How should it be prepared for local application?

A.—Mixed with 2 or 3 parts of castor or olive oil or soap liniment and rubbed into the skin with a piece of muslin or flannel.

FATS

Q.—Name the official solid vegetable fat.
A.—Oleum Theobromatis.

Q.—What is the synonym?
A.—Cacao Butter.

Q.—Give the official definition.
A.—A concrete fixed oil, obtained from the roasted seeds of Theobroma Cacao.

Q.—What is its melting-point?
A.—Between 30° and 35° C.

Q.—What adulterations are met with in it?
A.—Wax, stearin and tallow.

Q.—What use is made of it?
A.—A vehicle for suppositories, skin nutrient, emollient.

Q.—What is the Latin title for **Lard?**
A.—Adeps.

Q.—Give the official definition.
A.—The purified internal fat of the abdomen of the hog. Preserve it in a cool place in well-closed containers which are impervious to the fat.

Q.—What is its melting-point?
A.—36° to 42° C.

Q.—What impurities or adulterants may be met with in it?
A.—Alkalies, chlorides, free fatty acids, cotton-seed fat, beef tallow.

Q.—By what other name is it prescribed?
A.—Axungia porci.

Q.—What use is made of it in pharmacy?
A.—As a vehicle for ointments and cerates.

Q.—Will lard absorb any water when used in ointments?
A.—Yes, by diligent trituration it can be made to absorb about 10% of water.

Q.—What is the objection to having water present in lard?
A.—It causes the lard to decompose rather quickly.

Q.—How is this decomposition accounted for?
A.—Lard is an ester and all esters are comparatively quickly hydrolyzed.

Q.—What other form of lard is official?
A.—**Adeps Benzoinatus.**

Q.—How is it prepared?
A.—1% of Siam Benzoin is added to the lard and the mixture is then heated on the water-bath for two hours taking care not to let the temperature rise above 60° C. Strain and stir occasionally until cool.

Q.—How may the formula be altered?
A.—Permission is given to replace 5% of the lard with white wax in southern latitudes or in the heated season in other localities.

Q.—What fat-like substances are yielded by the sheep?
A.—Sevum Præparatum and Adeps Lanæ.

Q.—Give the more common names.
A.—Suet and wool fat.

Q.—Give the official definition for **Sevum Præparatum.**
A.—The internal fat of the abdomen of the sheep purified by melting and straining. Preserve Prepared Suet in well-closed vessels impervious to fat. It must not be used after it has become rancid.

Q.—In what particular does it differ from Lard?
A.—The melting point is about 10°C. higher.

Q.—What other form of Sevum is official?
A.—**Sevum Benzoinatum.**

Q.—How is it prepared?
A.—Mix 3% of benzoin with the suet and allow the mixture to stand at room temperature for 2 hours, then melt on a water-bath and maintain a temperature not exceeding 50°C. for one hour, stirring frequently; finally strain the mixture and stir until cold.

Q.—What is the synonym for Sevum Preparatum?
A.—Mutton suet.

Q.—What is the Latin title for **Wool Fat?**
A.—Adeps Lanæ.

Q.—What is the synonym?
A.—Anhydrous Lanolin.

Q.—Give the official definition.
A.—The purified fat of the wool of the sheep, freed from water. Preserve it in a cool place in well-closed containers which are impervious to fat.

Q.—Is it a true fat?
A.—No.

Q.—What is the proof that it is not a fat?
A.—No glycerin is yielded when it is decomposed.

Q.—To what class of substances does it belong?
A.—To the alcohols.

Q.—What is its principal constituent?
A.—Cholesterin.

Q.—How is it obtained?
A.—The alkaline washings from sheep-wool are treated with acid, thereby liberating fatty acid compounds of the cholesterin and isocholesterin and about 30% of fatty acids. The mixture is then treated with alkali which saponifies the free fats and emulsifies the cholesterin compounds. The mixture is now centrifuged which separates the cholesterin compounds.

Q.—What adulterants may be found in it?
A.—Petrolatum and glycerin.

Q.—How is the glycerin tested for?
A.—Extract with distilled water, evaporate the watery extract to dryness, the residue should have no sweet taste.

Q.—How is Petrolatum tested for?
A.—0.5 Gm. of Wool Fat will dissolve in 40 mils of boiling dehydrated alcohol; if it does not it is evidence of petrolatum.

Q.—How does it act with water?
A.—It will not dissolve in water but it will mix with twice its weight of water.

Q.—What are good solvents for it?
A.—Chloroform and ether.

Q.—At what temperature does it melt?
A.—38°C. to 42° C.

Q.—What use is made of it?
A.—Largely as an ointment vehicle.

Q.—Of what particular value is it as an ointment vehicle?
A.—It will penetrate through the skin and it will absorb large quantities of liquid.

Q.—What other form is official?
A.—**Adeps Lanæ Hydrosus.**

Q.—Give official definitions.
A.—The purified fat of the wool of the sheep, combined with not less than 25% nor more than 30% of water. Preserve it in well-closed containers which are impervious to fat.

Q.—What is the synonym?
A.—Lanolin.

Q.—Into what class of official preparations does it enter?
A.—Inuncta.

Q.—What are **Olea Infusa**?
A.—10% preparations of vegetable drugs made by first macerating the drug with alcohol and ammonia water, then adding sesame oil. This mixture is then warmed on the water-bath at 60° to 70° C. with frequent stirring until all the alcohol and ammonia water are driven off. It is then strained, expressed and the strained oil filtered.

Q.—How are they used?
A.—Applied externally.

Q.—What is probably the most common of the Infused Oils?
A.—Infused Oil of Hyoscyamus and this is an ingredient of Compound Oil of Hyoscyamus.

SOAPS

Q.—Define soap.
A.—Compounds resulting from the reaction between a fat or fixed oil and an alkali.

Q.—What alkalies are used in making the compounds which we ordinarily call soaps?
A.—Sodium and potassium hydroxides.

Q.—Are soaps pure and definite compounds?

A.—No, not in the true sense of the word, because the ingredients entering into the reaction are more or less impure, hence the products are not truly definite chemical compounds.

Q.—With regard to their solubilities how may they be classified?

A.—Into soluble and insoluble soaps.

Q.—Give an example of an insoluble soap.

A.—Lime liniment. Lead plaster.

Q.—How are insoluble soaps made?

A.—By reaction between a soluble metallic salt and a fat acid.

Q.—How are the soluble soaps classified?

A.—As hard and soft soaps.

Q.—What makes the difference between them?

A.—Sodium hydroxide makes a hard soap and potassium hydroxide makes a soft soap.

Q.—What other names are applied to hard and soft soaps?

A.—Hard soaps are called "soda soaps" and soft soaps are called "potash soaps".

Q.—Does the hardness of a soap depend entirely upon the alkali used?

A.—Not entirely, a fat containing more stearin will make a harder soap than a fat containing more olein, but with the same fat, sodium hydroxide will always make a harder soap than potassium hydroxide.

Q.—What name is given to the chemical process of soap making?

A.—Saponification.

Q.—Is this the only sense in which the term Saponification is used?

A.—No, it is used also in chemistry to denote the decomposition of an ester, regardless of whether the decomposition product is a soap or not.

Q.—What is the by-product in soap making?

A.—Glycerin.

Q.—Is heat necessary in soap making?
A.—Not absolutely necessary but it is an aid and facilitates saponification.

Q.—In the process is the fat or the alkali used in excess?
A.—A slight excess of alkali is used to insure complete decomposition of the fat.

Q.—Give the Latin title for the official Hard Soap.
A.—**Sapo.**

Q.—What is the synonym?
A.—White castile soap.

Q.—How is it made?
A.—Reaction between olive oil and sodium hydroxide.

$$\underset{\text{olein}}{C_3H_5(C_{18}H_{33}O_2)_3} + \underset{\text{sodium hydroxide}}{3\ NaOH} = \underset{\text{sodium oleate}}{3\ NaC_{18}H_{33}O_2} + \underset{\text{glycerin}}{C_3H_5(OH)_3}$$

Q.—Give the official definition.
A.—Soap prepared from olive oil and sodium hydroxide. Preserve dried or powdered soap in well-closed containers.

Q.—Is it alcohol-soluble as well as water-soluble?
A.—Yes, more readily so by the aid of heat.

Q.—How much water may it contain?
A.—As much as 36% in the bar, 10% in powdered.

Q.—How does its solution affect litmus?
A.—Alkaline.

Q.—What is the test for animal fats?
A.—0.64 Gm. of dried soap dissolved in 25 mils of hot alcohol should not gelatinize when cooled to 20° C., if it does it is evidence of animals fat.

Q.—What impurities are tested for?
A.—Sodium chloride, sodium carbonate, silica.

Q.—When soap is formed in the ordinary reaction how is it separated from the balance of the mixture?
A.—It is "salted out", that is a quantity of sodium chloride is added to the mixture and as the soap is insoluble in salt solution, it separates out.

Q.—Is every "soda soap" insoluble in salt water?
A.—No, marine soap forms a lather with salt water.

Q.—How is marine soap made?
A.—By saponifying cocoanut oil or resin with sodium hydroxide.

Q.—What is a "superfatted" soap?
A.—One that has an excess of fat.

Q.—What is the reason for superfatting soaps?
A.—They leave the skin softer, and in case of medicated soaps they prevent or retard any possible reaction between the medicinal agent and the soap.

Q.—What fats are generally used in superfatting soaps?
A.—Lanolin or olive oil as these have been found to be more agreeable to the skin.

Q.—What percentage of fat is used in excess?
A.—From 3% to 5%.

Q.—What are some of the medicated soaps?
A.—Tar 5%, sulphur 10%, salicylic acid 5%, borax 5%, phenol 5% and 10%; corrosive sublimate 0.1%, camphor 5%, naphthol 5%.

Q.—What is the Latin title for **Soft Soap?**
A.—Sapo Mollis.

Q.—By what other name is it known?
A.—Sapo Viridis.

Q.—What is it made from?
A.—Cottonseed oil 43%, potassium hydroxide 8.6%, alcohol 5%, and sufficient water to make 100%.

Q.—What is the alcohol for?
A.—It aids the saponification.

Q.—What should be the strength of the potassium hydroxide used?
A.—85%.

Q.—Can any other strength be used?
A.—Yes.

Q.—How is the required quantity of another strength ascertained?
A.—By dividing 7310 by the percentage strength of the potassium hydroxide in question.

Q.—How many Gm. must be used if it is 70% strength?
A.—$7310 \div 70 = 104.4$ Gm.

Q.—Where does the 7310 come from?
A.—It is the equivalent in 1% potassium hydroxide, of 86 Gm. of 85% strength, that is $85 \times 86 = 7310$.

Q.—Should the finished product be acid or alkaline?
A.—Alkaline.

Q.—What are the limits of alkalinity?
A.—Not less than 0.1% or more than 0.25% KOH.

Q.—How much water may it contain?
A.—Not to exceed 52%.

Q.—Can it be salted out like Castile Soap?
A.—No, if sodium chloride were added, it would at once be converted to a sodium soap.

Q.—What is Curd Soap?
A.—A soap made from animal fat.

Q.—By what other name is it called?
A.—Sapo animalis.

Q.—In what particular does it differ from other soaps?
A.—It is not soluble in alcohol.

Q.—How is red or mottled Castile Soap made?
A.—By adding a solution of ferrous sulphate to the soap, when this is oxidized by contact with the air it is red, but in the center of the bar where it is protected from the air it is grayish-brown.

Q.—Why does soap curdle with hard water?
A.—Hard water contains small quantities of calcium or magnesium salts in solution, these form with the soap solution calcium or magnesium oleate, which is insoluble.

Q.—Name an official liquid soap.
A.—Linimentum Ammoniæ; Linimentum Calcis.

FAT ACIDS AND DERIVATIVES

Q.—Name the two official fat acids.
A.—Acidum Oleicum and Acidum Stearicum.

Q.—Give the official definition for **Acidum Oleicum.**
A.—An acid obtained from fats, consisting chiefly of $C_{17}H_{33}$-COOH. Preserve it in well-closed glass or stoneware containers.

Q.—Is it a liquid or solid?
A.—A liquid.

Q.—What effect does exposure to air have on it?
A.—It becomes darker and absorbs oxygen.

Q.—What is its specific gravity?
A.—0.895 at 25° C.

Q.—What can you say of its solubility?
A.—Insoluble in water, soluble in 60% alcohol and stronger, soluble in the other organic solvents.

Q.—What is the test for the presence of mineral acids?
A.—Shake with an equal volume of distilled water, then separate the water and filter, the water will not be reddened by a drop of methyl orange T. S. unless mineral acids are present.

Q.—What is the source of commercial Oleic Acid?
A.—A by-product in the manufacture of stearin candles and in the manufacture of glycerin.

Q.—Into what class of preparations does it enter?
A.—The oleates and the petroxolins.

Q.—Give the official definition for **Acidum Stearicum.**
A.—An acid obtained from tallow and other solid fats, consisting chiefly of $C_{17}H_{35}COOH$.

Q.—What can you say of its solubility?
A.—Dissolves in 21 parts of alcohol, 2 of chloroform, 3 of ether. Insoluble in water.

Q.—Is it liquid or solid?
A.—Solid.

Q.—What is its melting point?
A.—56° C.

Q.—What impurities may be found in it?
A.—Undecomposed fat, mineral acids, paraffin.

Q.—What is its commercial source?
A.—From tallow or suet by decomposing with superheated steam. Also by hydrogenation of oleic acid.

Q.—What is the Latin title for **Glycerin?**
A.—Glycerinum.

Q.—What is the chemical name?
A.—Glycerol.

Q.—Give the official definition.
A.—A liquid obtained by the hydrolysis of vegetable and animal fats or fixed oils, purified by distillation and containing not less than 95% of the trihydric alcohol $C_3H_5(OH)_3$. Preserve it well in closed containers.

Q.—What effect does exposure to the air have on it?
A.—It absorbs moisture.

Q.—What is its specific gravity?
A.—Not less than 1.249.

Q.—What can you say of its solubility?
A.—Miscible with water and alcohol; insoluble in all the other organic solvents.

Q.—What can you say of the volatility of glycerin?
A.—It is not volatile in rather weak aqueous mixtures but when from 70% to 100% strength it volatilizes rapidly at 100° C.

Q.—Give its structural formula.
```
A.—H   H   H
    |   |   |
   CH—C—CH          triatomic propyl alcohol.
    |   |   |
   OH  OH  OH
```

Q.—What is it used for in pharmacy?
A.—Used as a solvent and preservative.

Q.—What preparations does it enter?
A.—Glycerin suppositories, glycerinated gelatin, the glycerites and fluidglycerates.

Q.—What is it therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—4 mils.

Q.—What compound of it is much used in the industries?
A.—Nitroglycerin.

Q.—What is its most important property?
A.—It is highly explosive.

Q.—How is it made?
A.—By dropping glycerin into a cooled mixture of nitric and sulphuric acids.

Q.—Why is it explosive?
A.—Because under certain conditions it is rapidly converted into a gas, which for each volume of nitroglycerin produces 713 volumes of gas.

Q.—How does its power compare with gunpowder?
A.—It has about three times the power of gunpowder.

Q.—What medicinal preparation of it is official?
A.—Spirit of nitroglycerin, 1%.

WAXES

Q.—What are the waxes chemically?
A.—They are compounds of the higher alcohols with fatty acids.

Q.—Are they saponifiable?
A.—Yes, but not in the sense that the fats are.

Q.—How do they differ?
A.—The waxes will absorb alkali because of the content of acid but **they yield no glycerin.**

Q.—Name the official waxes.
A.—Cera Flava, Cera Alba, Cetaceum.

Q.—What is the Latin name for wax?
A.—Cera.

Q.—Give the official definition for **Cera Flava.**
A.—A product obtained by melting and purifying the honeycomb of the bee, Apis mellifera.

Q.—What can you say of its solubility?
A.—Insoluble in water, partly soluble in alcohol; soluble in chloroform, ether, fixed and volatile oils.

Q.—What is its melting-point?
A.—62° to 65° C.

Q.—What is its specific gravity?
A.—0.95 to 0.96 at 25° C.

Q.—How is the specific gravity determined?

A.—By suspending the melted wax in a mixture of alcohol and distilled water, then determining the specific gravity of the alcoholic mixture.

Q.—What are common adulterants of Yellow Wax?

A.—Rosin, fatty acids, Japan wax, paraffin.

Q.—How is the **free acid number** of the wax **determined?**

A.—By titration with N/2 alcoholic KOH V. S. using phenolphthalein as an indicator.

Q.—What should the free acid number be?

A.—Not less than 18 nor more than 24.

Q.—How is the **ester number determined?**

A.—By adding 25 mils N/2 alcoholic KOH V. S. and 50 mils of alcohol to about 3 Gm. of the wax, then boiling the mixture for 2 hours with a reflux condenser, then titrating the excess of alkali with N/2 HCl V.S.

Q.—What is the ester number so obtained?

A.—Should be not less than 72 nor more than 77.

Q.—What is **meant by** the **free acid number?**

A.—The number of milligrams of absolute KOH required to neutralize the acid in one Gram of the wax.

Q.—What is **meant by** the **ester number** of wax?

A.—The number of milligrams of absolute KOH which will combine with one Gram of the wax.

Q.—In filtering the mixture of wax, distilled water and sodium hydroxide solution to test for adulteration, why does the U. S. P. direct to filter through asbestos or glass-wool?

A.—Because the hydroxide would dissolve some of the paper or cotton which would be precipitated on the addition of acid giving an incorrect result.

Q.—Give the official definition for **Cera Alba.**

A.—Yellow Wax, bleached.

Q.—How is it bleached?

A.—By melting the wax and forming it into ribbons then exposing these ribbons to the action of sunlight and moisture.

Q.—Is it bleached in any other way?

A.—Yes by treating it with chemical bleaching agents.

Q.—Which is better?
A.—That bleached by sunlight and moisture.

Q.—Is the White or Yellow the more stable?
A.—The Yellow as the White tends to become rancid.

Q.—What common adulterant is found in the White Wax?
A.—Paraffin.

Q.—What use is made of the waxes?
A.—They are used in preparing the Cerates, in stiffening ointments and in making plasters.

Q.—What is the English name for **Cetaceum?**
A.—Spermaceti.

Q.—Give the official definition for Cetaceum.
A.—A concrete fatty substance obtained from the head of the sperm whale, Physeter macrocephalus.

Q.—What is the melting point?
A.—42° to 50° C.

Q.—What is the specific gravity?
A.—0.938 to 0.944.

Q.—How is the specific gravity determined?
A.—In the same manner as the other waxes.

Q.—Is the spermaceti solid while in the head of the whale?
A.—No, it is liquid.

Q.—How is it obtained in a solid form?
A.—The liquid is subjected to strong pressure, the oil is rejected and the press-cake melted in water, the impurities are skimmed off and it is then allowed to congeal.

Q.—What can you say of its solubility?
A.—Insoluble in water, soluble in boiling alcohol and other organic solvents.

Q.—What adulterants may be found in **Cetaceum?**
A.—Paraffin and stearic acid.

OLEA VOLATILIA—VOLATILE OILS

Q.—By what other names are volatile oils called?
A.—Ethereal oils, essential oils.

Q.—What Latin name has been proposed for them?
A.—Aetheroleum. Aetherolea.

Q.—Why is the name "volatile oils" objectionable?
A.—Because the substances so named have nothing whatever in common with fats or fixed oils.

Q.—Why are they called volatile oils?
A.—Because they will evaporate without decomposition.

Q.—What is the source of volatile oils?
A.—Almost entirely from the vegetable kingdom.

Q.—What are the active constituents of the volatile oils, chemically?
A.—They vary widely, hydrocarbons, monatomic and diatomic alcohols, aldehydes, ketones, acids, inner oxide.

Q.—How are the volatile oils obtained?
A.—(a) By expression,—orange, lemon, bergamot.
(b) By distillation with water-cajuput.
(c) By distillation with steam-peppermint.
(d) By distillation from oleoresin-turpentine.
(e) By enfleurage-jasmin.
(f) Pneumatic, forcing air saturated with the fragrance through alcohol.

Q.—What is meant by "**enfleurage**"?
A.—Extraction with a fixed solvent, Flowers are put in direct contact with purified lard. The oil may then be obtained from the lard by washing with alcohol, the lard being insoluble.

Q.—Why is this method used instead of distillation?
A.—Because the odors so obtained are too subtle and the flowers too scarce to use expression.

Q.—What are the usual adulterants of volatile oils?
A.—Alcohol, fixed oils and cheaper volatile oils.

Q.—How may the presence of alcohol be detected?
A.—By use of red anilin, the anilin will not dissolve in the volatile oil but will in alcohol; by addition of water to a measured volume of oil, the alcohol will leave the oil and mix with the water, thus increasing its volume and correspondingly decreasing the volume of the oil; by turning milky when shaken with water.

Q.—How are the fixed oils detected?

A.—By dropping the suspected oil on clean white paper, then volatilizing same, if fixed oil is present it will leave a greasy stain.

Q.—How are the cheaper volatile oils detected?

A.—Optical rotation, specific gravity, more frequently by a well-trained sense of smell.

Q.—How do the specific gravities range?

A.—From 0.83 to 1.182 but generally less than 1.

Q.—Give the general solubility of volatile oils.

A.—Slightly soluble in water, soluble in all proportions in alcohol, soluble in all other organic solvents.

Q.—How should volatile oils be stored?

A.—In a dark, cool place, in completely filled bottles. Some prefer to add at once 10% of alcohol. Add a small quantity of glycerin, then turn the bottle upside down, the glycerin will not mix with the oil but flows into the neck of the bottle thus sealing it against air.

Q.—What is the color of pure fresh volatile oils?

A.—Colorless.

Q.—How do they decompose?

A.—They oxidize, acquire color and resinify.

Q.—What may be done to restore them?

A.—Some may in a measure be restored by shaking with common salt then distilling. Some are treated with a solution of borax. Some with lime-water and distillation.

Q.—How do the boiling points of the volatile oils range?

A.—Considerably higher than water, 150° to 250° C.

Q.—How do they behave with iodine?

A.—They fulminate.

Q.—How do they react with nitric acid?

A.—They react violently and in many cases take fire.

Q.—How do the alkalies affect them?

A.—They do not form soaps and, of course, no glycerin can be formed. In a few cases other compounds are formed.

Q.—What general name is given to solid principles found in volatile oils?

A.—Stearopten.

Q.—What name is given to the liquid portion?
A.—Eleopten.

Q.—Into what classes may the volatile oils be divided?
A.—I—terpenes.
II—oxygenated.
III—nitrogenated.
IV—sulphurated.
V—empyreumatic.

Q.—What elements are found in the terpenes?
A.—Carbon and hydrogen.

Q.—By what other names is this class known?
A.—Camphenes: hydrocarbons.

Q.—What is the official type of this class?
A.—**Oleum terebinthinæ; oil of turpentine.**

Q.—What are the synonyms?
A.—Turpentine oil; spirits of turpentine.

Q.—What is the official definition?
A.—The volatile oil distilled with water from the concrete oleoresin obtained from Pinus palustris or other species of Pinus. Preserve in well-closed containers.

Q.—What is its solubility?
A.—Soluble in 5 volumes of alcohol.

Q.—What is its specific gravity?
A.—0.86 to 0.87.

Q.—At what temperature does it distil?
A.—154° to 170° C.

Q.—How does it affect the plane of polarized light?
A.—May turn it either to the right or left. The American being dextrogyrate, the French lævogyrate.

Q.—What adulterants may be found in it?
A.—Fixed and mineral oils.

Q.—What test is used to detect mineral oil?
A.—Sulphuric acid which should destroy 99% of the turpentine oil. The refractive index of less than 1.5 for the clear layer left after the sulphuric acid treatment also indicates mineral oil.

Q.—What use is made of it commercially?
A.—Solvent for paints.

Q.—What is it therapeutically?
A.—Stimulant, diuretic and antiseptic.

Q.—What other form of the oil is official?
A.—**Oleum Terebinthinæ Rectificatum.**

Q.—How is it prepared?
A.—By thoroughly shaking together equal volumes of oil of turpentine and solution of sodium hydroxide, then recovering ¾ of the oil by distillation, drying with anhydrous calcium chloride and filtering.

Q.—How is it stored?
A.—In well-stoppered containers of amber color and in a cool place.

Q.—Why is it so treated?
A.—To remove acid and resin which makes it unfit to administer internally.

Q.—What two official substances are derived from Oleum Terebinthinæ?
A.—Terebenum and Terpini Hydras.

Q.—Give the official definition for **Terebene.**
A.—A liquid consisting of dipentene and other hydrocarbons, obtained by the action of concentrated sulphuric acid on oil of turpentine. Preserve it in well-closed containers, protected from the light.

Q.—Just how is it made?
A.—20 parts of oil of turpentine are mixed with 100 parts of concentrated sulphuric acid and allowed to stand for 24 hours. It is then heated to boiling, allowed to cool. The upper layer is separated, neutralized with chalk, then distilled.

Q.—Describe Terebene.
A.—It is a thin, corlorless liquid having a rather pleasant thyme-like odor. An aromatic, somewhat terebinthinate taste.

Q.—What can you say of its solubility?
A.—Only slightly soluble in water; soluble in 3 mils of alcohol.

Q.—What effect does light have on it?
A.—It causes it to resinify and acquire an acid taste.

Q.—What is its boiling point?
A.—Between 160° and 172° C.

Q.—What is it therapeutically?
A.—Antiseptic and expectorant.

Q.—What is the dose?
A.—0.25 mil.

Q.—Give the official definition for **Terpin Hydrate.**
A.—The hydrate ($C_{10}H_{18}(OH)_2 + H_2O$) of the dihydric alcohol terpin. Preserve it in well-closed containers in a cool place.

Q.—Describe it.
A.—Colorless crystals, nearly odorless, aromatic taste.

Q.—How is it made?
A.—Reaction between an alcoholic solution of oil of turpentine and nitric acid. Purified by recrystallization.

Q.—What can you say of its solubility?
A.—Soluble in 200 mils of water, 13 mils of alcohol, and in 1 mil of boiling glacial acetic acid.

Q.—What is it therapeutically?
A.—Expectorant, stimulant to mucous membranes.

Q.—What is the dose?
A.—0.25 Gm.

Q.—In what form is it usually prescribed?
A.—As an elixir, either plain or in combination.

Q.—What is the chemical formula for terpene, the principal constituent of the terpenes?
A.—$C_{10}H_{16}$.

Q.—What is a sesquiterpene?
A.—A compound having one and one-half times the terpene formula, $C_{15}H_{24}$.

Q.—What other volatile oils may be considered terpenes?
A.—Oil of Orange, Lavender, Pine Needles,
Cubeb, Lemon, Bitter Orange,
Eucalyptus, Nutmeg, Bergamot.
Juniper, Rosemary,

Q.—Do not some of these oils contain Oxygen?
A.—Yes, but they are made up largely of terpene.

Q.—Give the official definition for **Oleum Eucalypti.**
A.—A volatile oil distilled from the fresh leaves of Eucalyptus Globulus or from some other species of Eucalyptus and yielding

not less than 70% by volume of Eucalyptol (cineol). Preserve in well-stoppered amber-colored bottles, protected from the light.

Q.—What is it therapeutically?
A.—Antiseptic.

Q.—What is the dose?
A.—0.5 mil.

Q.—Outline assay for the eucalyptol.
A.—To a measured portion of the oil add arsenic acid T. S. until precipitation is complete. The precipitate is eucalyptol arsenate. Transfer this to an accurate measuring flask and decompose it with hot distilled water. The eucalyptol will separate and may be read off.

Q.—Give the official definition for **Oleum Limonis.**
A.—A volatile oil obtained by expression from the fresh peel of the ripe fruit of Citrus medica Limonum and yielding not less than 4% of aldehydes from Oil of Lemon, calculated as Citral ($C_{10}H_{16}O$). Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light. Oil having a terebinthinate odor is not to be dispensed.

Q.—Give another method for maintaining oil of lemon in good condition.
A.—Pour a little glycerin into the bottle, then keep the bottle upside down. The glycerin and the oil will not mix, the glycerin being much heaver will settle in the neck of the bottle, thus preventing any air entering. When the oil is to be dispensed the glycerin will settle to the bottom and the oil may be readily decanted.

Q.—What is the largest constituent of Oil of Lemon?
A.—Limonene, which is a terpene, 90%?

Q.—What is the Specific Gravity of Oil of Lemon?
A.—0.853.

Q.—What is its refractive index?
A.—1.475.

Q.—What is its principal use?
A.—As a flavoring agent.

Q.—What is the dose?
A.—0.2 mil.

Q.—Give the official definition for **Oleum Rosmarini.**
A.—A volatile oil distilled from the fresh flowering tops of Rosmarinus officinalis, yielding not less than 2.5% of ester calculated as bornyl acetate and not less than 10% of borneol. Preserve it in well-stoppered bottles of amber color, in a cool place, protected from the light.

Q.—What can you say of its solubility?
A.—Soluble in 10 mils of 80% alcohol.

Q.—What is its specific gravity?
A.—0.894 to 0.912.

Q.—What is the chemical formula for borneol?
A.—$C_{10}H_{17}OH$.

Q.—To what class of compounds does borneol belong?
A.—Alcohols.

Q.—Give the official definition for **Oleum Bergamottæ.**
A.—A volatile oil obtained by expression from rind of the fresh fruit of Citrus Aurantium Bergamia and containing not less than 36% of ester, calculated as linalyl acetate. Preserve it in small, amber-colored, well-stoppered bottles in a cool place, protected from the light.

Q.—What can you say of its solubility?
A.—Soluble in 2 volumes of 80% alcohol.

Q.—Is it optically active?
A.—Yes, dextrorotatory from 8° to 24° in 100 mm. tube.

Q.—Outline the **assay method for linalyl acetate?**
A.—Weigh off a definite weight of the oil, then add an excess of N/2 alcoholic KOH V. S. and reflux on a water-bath for a half hour, cool and titrate the residual N/2 KOH with N/2 H_2SO_4 V. S. and multiply the number of mils of N/2 KOH consumed by the oil by 0.09808 which gives the Grams of linyl acetate in the oil used.

Q.—What is the oil used for?
A.—Almost entirely for its odor.

OXYGENATED OILS

Q.—How do the oxygenated oils differ in composition from the terpenes?
A.—They contain oxygen in addition to carbon and hydrogen.

Q.—What marked physical property do they have?
A.—Generally they have pleasant odors.

Q.—Give the official definition for **Oleum Anisi.**
A.—A volatile oil distilled from the ripe fruit of Pimpinella Anisum or from the ripe fruit of Illicium verum. The botanical source from which it is derived must be stated on the label. If solid material has separated, carefully warm the oil until liquefied and thoroughly mix it before dispensing. Preserve it in well-stoppered, amber-colored bottles, protected from the light.

Q.—What are the two English names for Oleum Anisi?
A.—Oil of anise and oil of star anise.

Q.—What is its principal constituent?
A.—Anethol, about 90%.

Q.—What is the solubility of the oil?
A.—Soluble in 3 volumes of 90% alcohol.

Q.—What is its specific gravity?
A.—0.978 to 0.988.

Q.—Is it optically active?
A.—Yes, slightly varying from +1 to −2 in 100 mm. tube.

Q.—What is its refractive index?
A.—1.544 to 1.56.

Q.—What is it therapeutically?
A.—Carminative.

Q.—What is the dose?
A.—0.2 mil.

Q.—What is taken as an indication of good oil?
A.—Its congealing point which should not be below 15° C.

Q.—What oil seems much like Oleum Anisi?
A.—Oleum Fœniculi.

Q.—Give the official definition for **Oleum Fœniculi.**
A.—A volatile oil, distilled from the ripe fruit collected from cultivated varieties of Fœniculum vulgare. If wholly or partly solidified carefully warm the Oil until liquefied and thoroughly mix before dispensing. Preserve in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is its principal constituent?
A.—Anethol, 50% to 60% and some fenchone.

Q.—What is the specific gravity of the oil?
A.—0.953 to 0.973.

Q.—What is its solubility?
A.—8 volumes of 80% alcohol, or 1 volume of 90% alcohol.

Q.—What is its optical rotation?
A.—+12 to +24 in a 100 mm. tube.

Q.—What is its congealing point?
A.—Not below 3° C.

Q.—Give the official definition for **Oleum Cari.**
A.—A volatile oil distilled from the fruit of Carum Carvi and yielding not less than 50% by volume of carvone. Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is carvone?
A.—It is a ketone.

Q.—What is the solubility of the oil?
A.—8 volumes of 80% alcohol.

Q.—What is its specific gravity?
A.—0.900 to 0.910.

Q.—What is its optical rotation?
A.—From +70 to +80 in a 100 mm. tube.

Q.—What is the dose of the oil?
A.—0.2 mil.

Q.—What other volatile oil contains Carvone?
A.—Oil of spearmint.

Q.—Give the official definition for **Oleum Menthæ Viridis.**
A.—A volatile oil distilled from the flowering plant of Mentha spicata and yielding not less than 43% of carvone, by volume. Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is its solubility?
A.—Soluble in 1 volume of 80% alcohol.

Q.—Is it optically active?
A.—Yes, –38° to –55° in a 100 mm. tube.

Q.—If both oil of spearmint and oil of caraway contain about half their volumes of carvone, how do you account for the great difference in odor?

A.—The difference in optical rotation shows that oil of caraway contains dextro-carvone while oil of spearmint contains laevo-carvone.

Q.—Give the official definition for **Oleum Caryophylli.**

A.—A volatile oil distilled from the flower buds of Eugenia Aromatica and Jambosa Caryophyllus and yielding not less than 82% by volume of eugenol. Preserve it in well-stoppered, amber-colored bottles in a cool place, protected from the light.

Q.—What is the English name for this oil?

A.—Oil of Clove.

Q.—What can you say of the solubility of the oil?

A.—Soluble in 2 volumes of 70% alcohol.

Q.—What is its specific gravity?

A.—1.038 to 1.060.

Q.—Is it optically active?

A.—Yes, slightly so, should not exceed –1° 10′.

Q.—What is it therapeutically?

A.—Stimulant, carminative, counter-irritant.

Q.—What is the dose?

A.—0.2 mil.

Q.—What is eugenol?

A.—A phenol.

Q.—Outline the assay for eugenol.

A.—Use 10 mils of the oil and shake with excess of KOH T. S., the eugenol will form a compound with the KOH, now read off the residual oil which may be calculated directly to volume per cent.

Q.—Which variety of Cinnamomum yields the official oil?

A.—Cinnamomum Cassia.

Q.—What is the Latin title for the oil?

A.—**Oleum Cassiæ.**

Q.—Give the synonym.

A.—Cassia oil.

Q.—Give the official definition.
A.—A volatile oil distilled from Cinnamomum Cassia, rectified by steam distillation and yielding not less than 80% by volume of cinnamic aldehyde. Preserve it in well-stoppered, amber-colored bottles in a cool place, protected from the light.

Q.—What is its specific gravity?
A.—1.045 to 1.063.

Q.—Is it optically active?
A.—Yes, varies from –1° to +1° in a 100 mm. tube.

Q.—Why will this oil frequently become quite acid?
A.—The aldehyde quite readily oxidizes to cinnamic acid.

Q.—What two impurity tests are given in the U. S. P.?
A.—One for rosin and one for heavy metals.

Q.—Why might there be heavy-metal impurities?
A.—The oil may be shipped from China in lead or copper containers and the acid may attack the metal to such an extent as to make the metal content decidedly objectionable.

Q.—What is the dose of the oil?
A.—0.2 mil.

Q.—Give official definition for **Oleum Menthæ Piperitæ.**
A.—Volatile oil distilled from the flowering plant of Menthæ piperita, rectified by steam distillation and yielding not less than 5% of esters calculated as menthyl acetate and not less than 50% of total menthol, free and as esters. Preserve in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is the solubility of the oil?
A.—4 volumes of 70% alcohol.

Q.—What is its specific gravity?
A.—0.896 to 0.908.

Q.—Is it optically active?
A.—Yes, varies between –23° and –33° in a 100 mm. tube.

Q.—What may be said of the complexity of this oil?
A.—It is the most complex of the volatile oils so far examined, having no less than 15 constituents.

Q.—What different peppermint oils are found in the market?
A.—Some five or six American brands, English, German and Japanese.

Q.—Which oil contains the greatest percentage of menthol?
A.—The Japanese, as much as 90% in some samples.

Q.—Is this the best medicinal oil?
A.—No, it has a disagreeable bitter taste.

Q.—What is the oil therapeutically?
A.—Carminative, flavor.

Q.—What is the dose?
A.—0.2 mil.

Q.—What is the synonym for **Oleum Pimentæ?**
A.—Oil of allspice.

Q.—What part of the plant yields the oil?
A.—The fruit.

Q.—Give the official definition for **Oleum Pimentæ.**
A.—A volatile oil, distilled from the fruit of Pimenta officinalis, yielding not less than 65% by volume of eugenol. Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is the solubility of the oil?
A.—1 volume of 90% alcohol, and 2 volumes of 70% alcohol.

Q.—What is its specific gravity?
A.—1.018 to 1.048.

Q.—What part of Santalum album yields the volatile oil?
A.—The wood.

Q.—Give the official definition for **Oleum Santali.**
A.—A volatile oil distilled from the wood of Santalum album, yielding not less than 90% of alcohols, calculated as santalol. Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is its solubility?
A.—5 volumes of 70% alcohol.

Q.—What is its specific gravity?
A.—0.965 to 0.980.

Q.—Is it optically active?
A.—Yes, varies from –15° to –20°.

Q.—What is it therapeutically?
A.—Antiseptic and stimulant to mucous surfaces.

Q.—What commercial use is made of it?

A.—Used in perfumes as a base for odor because of its stability or lasting qualities.

Q.—What is the dose of the oil?

A.—0.5 mil.

Q.—Give the official definition for **Oleum Thymi.**

A.—A volatile oil distilled from the flowering plant of Thymus vulgaris and containing not less than 20% by volume of phenols. Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is the principal phenol in Oil of Thyme?

A.—Thymol.

Q.—What is the solubility of the oil?

A.—2 volumes of 80% alcohol.

Q.—What are the essential features of the assay process?

A.—Add to a measured portion of the oil an excess of sodium hydroxide T. S., shake thoroughly for the purpose of causing the phenols to combine with the alkali, then measure the residual liquid.

Q.—What is the color of the oil?

A.—May be either colorless or red.

Q.—What is the test for added phenols?

A.—Shake 1 mil of the oil with 10 mils of hot distilled water, after cooling filter the aqueous layer, then add a drop of ferric chloride T. S. to it when no blue or violet color should show.

Q.—What is it therapeutictlly?

A.—Antiseptic and carminative.

Q.—What is the dose?

A.—0.2 mil.

Q.—Give the official definition for **Oleum Chenopodii.**

A.—A volatile oil distilled from Chenopodium ambrosioides anthelminticum. Preserve it in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is the synonym?

A.—Oil of American wormseed.

Q.—What is another common name?

A.—Baltimore oil.

Q.—What is its solubility?
A.—8 volumes of 70% alcohol.

Q.—What is it therapeutically?
A.—Anthelmintic.

Q.—How is it usually administered?
A.—With castor oil.

Q.—What is the dose?
A.—0.2 mil.

Q.—What has brought this oil into prominence of late?
A.—The successful treatment of the hook-worm disease with it.

Q.—Is it toxic?
A.—Yes, rather more so than the other volatile oils.

Q.—What is Oil of Neroli?
A.—**Oil of orange flowers.**

Q.—Name the official Nitrogenated Oil.
A.—Oleum Amygdalæ Amaræ.

Q.—Why is it called Nitrogenated?
A.—Because of the nitrogen contained in the hydrocyanic acid which the oil must contain.

Q.—Give the official definition for **Oleum Amygdalæ Amaræ.**
A.—A volatile oil obtained by maceration and distillation from the ripe kernels of Prunus amara and from other kernels containing amygdalin. It yields not less than 85% of benzaldehyde and not less than 2% nor more than 4% of hydrocyanic acid. The botanical source from which it is derived must be stated on the label. Preserve it in well-stoppered, small, amber-colored bottles protected from the light and air. Oil showing crystals of benzoic acid must not be dispensed.

Q.—What note follows directly after the definition?
A.—This oil is intended for medicinal use, it must not be used for flavoring foods.

Q.—Why must it not be used in foods?
A.—Because the hydrocyanic acid which it contains is poisonous.

Q.—Does the HCN reside naturally in the kernels?
A.—No,

Q.—How then is it produced in the oil?

A.—The seed contains a glucoside, amygdalin and a ferment emulsin. When these are in contact with water they react to form hydrocyanic acid, benzaldehyde and glucose.

Q.—Give the equation representing the formation of the volatile oil of bitter almond.

A.—$\underset{\text{(amygdalin)}}{C_{20}H_{27}NO_{11}} + 2H_2O + \text{emulsin} = \underset{\text{(benzaldehyde)}}{C_6H_5CHO} + \underset{\text{(hydrocyanic acid)}}{HCN} + \underset{\text{(glucose)}}{2C_6H_{12}O_6}$.

Q.—What is the white powder sometimes seen in bottles of this oil?

A.—Benzoic acid.

Q.—How does it get there?

A.—It is formed from the oxidation of benzaldehyde.

Q.—Is such oil fit for use?

A.—No.

Q.—How does the oil affect litmus?

A.—When fresh it is neutral but gradually develops an acid reaction due to the formation of benzoic acid.

Q.—Is it soluble in water?

A.—Slightly more than the other volatile oils.

Q.—What more may be said of its solubility?

A.—Soluble in alcohol or ether.

Q.—What is it therapeutically?

A.—Sedative.

Q.—What is the dose?

A.—0.03 mil.

Q.—What is the official Sulphurated Oil?

A.—**Oleum Sinapis Volatile.**

Q.—What is its source?

A.—Maceration and subsequent distillation of Black Mustard Seed.

Q.—What is done with the mustard seed before maceration?

A.—It is deprived of its fixed oil by expression or by the use of some volatile solvent.

Q.—Give the official definition for Oleum Sinapis Volatile.

A.—A volatile oil produced synthetically or obtained from the seed of Brassica nigra (freed from fatty oil) by maceration with water and subsequent distillation. It yields not less than 92% of allyl isothiocyanate. The label must state whether the Oil has been made synthetically or obtained from the black mustard. Preserve in well-stoppered, amber-colored bottles, in a cool place, protected from the light.

Q.—What is the chemical formula for allyl isothiocyanate?

A.—C_3H_5NCS.

Q.—Is not C_3H_5 the glyceryl radical?

A.—Yes, but the glyceryl radical is derived from a saturated compound and has a valence of 3, while the allyl radical is derived from an unsaturated compound an has a valence of only one.

Q.—Show the structural formula for allyl radical.

$$\begin{array}{ccccc} & H & & H & & H \\ & | & & | & & | \\ H- & C & = & C & — & C-H \end{array}$$

A.—H-C = C — C-H, showing a free bond at the 3rd C atom.

Q.—Show the difference in structure between the normal thiocyanate and the iso-thiocyanate.

A.—$R — C \equiv N = S \qquad R — N = C = S.$

Q.—What other class of compounds might this be likened to?

A.—The nitriles and the iso-nitriles, where the N atom has a valence of three in one case and five in the other.

Q.—Does allyl isothiocyanate exist naturally in the seed?

A.—No, it is developed in the presence of moisture by the action of a ferment myrosin upon the glucoside sinigrin (potassium myronate), the resulting products being glucose, potassium bisulphate and allyl isothiocyanate.

Q.—What does the U. S. P. direct about tasting or smelling this oil?

A.—That great caution should be exercised in smelling it and only tasted when highly diluted.

Q.—What is its specific gravity?

A.—1.013 to 1.020.

Q.—What is the test for the presence of alcohol, chloroform, petroleum or fatty acids?

A.—Boiling point or distillation, it should all distill between 148° and 154° C.

Q.—What care must be exercised in handling this oil?

A.—Great care must be taken when dispensing this oil, for its fumes are so irritating that in pouring from one bottle to another, the mucous membranes of the nose and eyes may be violently attacked.

Q.—What use is made of it?

A.—Generally as a counterirritant.

Q.—How is it ordinarily used?

A.—By diluting with olive oil; it is then applied as a stimulating liniment.

Q.—Is it ever given internally?

A.—The fact that the U. S. P. gives an internal dose indicates that it may be.

Q.—What is the dose?

A.—0.008 mil. ⅛ minim.

Q.—What effect would macerating the seed with hot water have?

A.—It would destroy the ferment and no volatile would form.

Q.—Name the so-called empyreumatic oils.

A.—Oleum Cadinum; Picis Liquidæ Rectificatum and Betulæ Empyreumaticum Rectificatum.

Q.—What is meant by Empyreumatic?

A.—Having an odor of burned wood.

Q.—How are such oils usually produced?

A.—Usually by dry or destructive distillation.

Q.—Give the official definition for **Oleum Cadinum.**

A.—An empyreumatic oil obtained from the dry distillation of the wood of Juniperus Oxycedrus.

Q.—What are the synonyms?

A.—Cade oil, oil of juniper tar, oleum juniperi empyreumaticum.

Q.—What can you say of its solubility?

A.—Insoluble in water, partly soluble in alcohol, petroleum benzin. Soluble in 3 volumes of ether. Soluble in amyl alcohol, chloroform, glacial acetic acid or oil of turpentine.

Q.—What is it therapeutically?

A.—Stimulant and antiseptic.

Q.—Give the official definition for **Oleum Picis Liquidæ Rectificatum.**

A.—A rectified volatile oil distilled from Tar.

Q.—What can you say of its solubility?

A.—Soluble in alcohol.

Q.—What is it therapeutically?

A.—Stimulant and antiseptic.

Q.—What is the dose?

A.—0.2 mil.

Q.—Give the official definitioin for **Oleum Betulæ Empyreumaticum Rectificatum.**

A.—The pyroligneous oil obtained by dry distillation of the bark and wood of Betula alba, rectified by steam distillation.

Q.—What are the synonyms?

A.—Rectified Empyroligneous Oil of Birch, Oleum Rusci Rectificatum.

Q.—What is the English title?

A.—Rectified Oil of Birch Tar.

Q.—What are the N. F. tests given for?

A.—To distinguish it from oil of cade.

Q.—Into what preparation does it enter?

A.—Ungt. Resorcinolis Compositum.

Q.—What oil did it displace in this preparation?

A.—Oil of cade.

SOLID DERIVATIVES OF VOLATILE OILS

Q.—Define **Camphora.**

A.—A ketone obtained from Cinnamomum Camphora; it is dextrorotatory. Preserve it in well-closed containers in a cool place.

Q.—Why should it be kept in well-closed containers?

A.—Because it is volatile.

Q.—Explain why camphor kept in a shelf bottle will usually be found distributed all over the back of the bottle.

A.—The camphor naturally volatilizes, the portion of the bottle next to the wall is the coolest, hence the camphor condenses there.

Q.—What is the chemical formula for Camphor?
A.—$C_9H_{16}CO$.

Q.—Why is it considered a ketone?
A.—The oxygen which it contains is connected directly to a carbon atom and not combined with a hydrogen atom.

Q.—Where does most of the Camphor come from?
A.—From the island of Formosa, a Japanese possession.

Q.—How is it produced?
A.—The wood in chips is mixed with water and distilled, the semi-solid distillate is subjected to hydraulic pressure to separate the stearoptene from the eleoptene. The stearoptene is then purified by sublimation.

Q.—Is any produced in the United States?
A.—Yes, small quantities are produced in Florida.

Q.—Has it ever been made synthetically?
A.—Yes, from oil of turpentine.

Q.—What can you say of its solubility?
A.—Slightly soluble in water; readily soluble in alcohol, ether, chloroform, carbon disulphide, fixed or volatile oils.

Q.—What is its melting point?
A.—Between 174° and 177° C.

Q.—What is the U. S. P. test for presence of water?
A.—A solution of 1:10 in petroleum benzin should show no cloudiness.

Q.—How is it reduced to a powder?
A.—By triturating with a little alcohol, ether or chloroform.

Q.—Which of the three liquids is preferable?
A.—Alcohol.

Q.—After it is powdered will it remain so?
A.—No, it will soon form in lumps again.

Q.—What can be done to maintain it in a powdered form?
A.—Mix it with a very little white vaseline.

Q.—What is it therapeutically?
A.—Stimulant, diaphoretic, anodyne, sedative.

Q.—What is its internal action?
A.—Said to be sedative.

Q.—What is the dose?
A.—By mouth 0.2 Gm.; hypodermic 0.1 Gm.

Q.—How is it given hypodermically?
A.—In sterile solution in olive oil, cottonseed oil or expressed oil of almonds.

Q.—What governs the selection of the oil for the solution?
A.—That which is most free from acid is used.

Q.—How does Camphor behave when triturated with menthol, thymol, phenol and like substances?
A.—The mixture liquefies.

Q.—Is the product so produced a chemical one?
A.—It is not looked upon as a chemical change but as a mutual solution of the two solids.

Q.—What is a proof of this contention?
A.—When this liquid is poured into water, it will separate into its two constituents.

Q.—Name an official derivative compound of Camphor.
A.—**Camphora Monobromata.**

Q.—Give its official definition.
A.—Ortho-monobromcamphor. Preserve it in well-closed containers, protected from the light.

Q.—How is it prepared?
A.—By heating a mixture of camphor and bromine in a closed retort to a temperature of 134°C., then cooling and extracting with benzene. It is then purified by recrystallization.

Q.—What is it therapeutically?
A.—Sedative.

Q.—What is the dose?
A.—0.125 Gm.

Q.—Give the official definition for **Menthol.**
A.—A secondary alcohol obtained from oil of peppermint or other mint oils. Preserve it in well-closed containers in a cool place.

Q.—Is it a solid or a liquid?
A.—A solid.

Q.—What can you say of its solubility?
A.—Very slightly soluble in water, freely soluble in alcohol, ether and chloroform.

Q.—What is its melting point?
A.—42 to 44°C.

Q.—Is it optically active?
A.—Yes, it is lævorotatory.

Q.—What is the test for presence of wax, paraffin or inorganic matter?
A.—It must volatilize leaving not more than 0.05% residue.

Q.—What is the test for the presence of **Thymol**?
A.—When dissolved in glacial acetic acid, then sulphuric acid and a drop of nitric added it should show no green color.

Q.—What is it therapeutically?
A.—Antiseptic and refrigerant application.

Q.—How does it behave when triturated with hydrated chloral thymol or phenol?
A.—It liquefies.

Q.—How is Menthol obtained?
A.—By placing the oil in contact with a freezing mixture, then filtering the semisolid mass on a filter, and finally drying the crystals in bibulous paper.

Q.—What is the official dose?
A.—0.06 Gm.

Q.—What proof is there that it is a secondary alcohol?
A.—It oxidizes to the ketone menthone when treated with chromic acid.

Q.—Give the chemical formula.
A.—$C_{10}H_{19}OH$; $C_6H_9(CH_3).(OH)(C_3H_7)$ 1:3:4.

Q.—To what class of compounds does **Thymol** belong?
A.—Phenols.

Q.—Give the official definition for Thymol.
A.—A phenol occurring in the volatile oil of Thymus vulgaris and in some other volatile oils. Preserve in well-closed containers.

Q.—What can you say of its solubility?
A.—Soluble in 1010 mils of water, readily soluble in the organic solvents.

Q.—Is it optically active?
A.—No.

Q.—What is its melting point?
A.—Between 48° and 51°C.

Q.—What is the test for added phenol?
A.—An alcoholic solution 1:20 is not colored violet on the addition of ferric chloride T. S.

Q.—What is it therapeutically?
A.—Antiseptic and anthelmintic.

Q.—What is the dose?
A.—Antiseptic 0.125 Gm. anthelmintic 1 Gm.

Q.—What particular use is made of it as an anthelmintic?
A.—In the treatment of hook worm.

Q.—What precaution must be taken during its administration to destroy hook worm?
A.—Not to administer purgative oils for they are likely to have such solvent action on the thymol that it will be absorbed in toxic quantities.

Q.—How is Thymol usually produced?
A.—The usual method is to saponify the oil with sodium hydroxide, forming sodium thymol which dissolves in the aqueous layer of the mixture. This aqueous layer is carefully separated from the oily layer, the latter being rejected. The thymol is then set free by decomposing the sodium thymol with hydrochloric acid.

Q.—What important compound of thymol is official?
A.—**Thymolis Iodidum.**

Q.—Give the official definition.
A.—Chiefly dithymol-diiodide. It contains when dried to constant weight in a desiccator over sulphuric acid not less than 43% of iodine. Preserve it in well-closed containers protected from the light.

Q.—What is the "trade name" for the compound?
A.—Aristol.

Q.—How is it made?
A.—Reaction between iodine, potassium iodide, thymol and sodium hydroxide.

Q.—What can you say of its solubility?
A.—Insoluble in water and glycerin; slightly soluble in alcohol; readily soluble in chloroform, ether, collodion and in fixed and volatile oils.

Q.—Name some of the U. S. P. requirements for this.

A.—Must not contain more than 5% of moisture; nor yield more than 1.5% of ash; must not contain free iodine, alkali nor haloid salts.

Q.—What use is made of it?

A.—Used largely as a dusting-powder for the antiseptic value of the iodine.

Q.—Name the official liquid derivatives from volatile oils.

A.—Eucalyptol, benzaldehyde, eugenol, anethol.

Q.—What is the synonym for **Eucalyptol**?

A.—Cineol.

Q.—To what class of chemical compounds has it been assigned?

A.—Organic oxides.

Q.—Give the official definition.

A.—An organic compound obtained from the volatile oil of Eucalyptus Globulus and from other sources. Preserve it in well-closed containers, in a cool place, protected from the light.

Q.—How is it made synthetically?

A.—By treating terpineol with phosphoric acid.

Q.—How is it obtained from oil of eucalyptus?

A.—By fractional distillation, that portion of the oil distilling between 130° and 180° C. is collected and redistilled over potassa.

Q.—What can you say of its solubility?

A.—Very slightly soluble in water, miscible with alcohol, chloroform, ether, glacial acetic acid and fixed and volatile oils.

Q.—What distinguishes it from oil of eucalyptus and many other volatile oils?

A.—It is optically inactive.

Q.—What impurities may be found in it?

A.—Saponifiable oils and phenols.

Q.—What is the origin of the synonym Cineol?

A.—Eucalyptol was originally found in oil of the seed of Artemisia cinae, a variety of Levant wormseed.

Q.—What is it therapeutically?

A.—Antiseptic and stimulant.

Q.—What is the dose?

A.—0.3 mil.

Q.—Give the official definition for **Benzaldehydum.**

A.—An aldehyde produced synthetically or obtained from oil of bitter almond and containing not less than 85% of C_6H_5CHO. Preserve it in small, well-stoppered bottles, protected from the light.

Q.—How may it be prepared synthetically?

A.—By the oxidation of benzyl alcohol or by treatment of benzyl chloride with milk of lime.

Q.—What is its principal use?

A.—Used principally as a perfume or flavor.

Q.—What is the internal dose?

A.—0.03 mil.

Q.—What dangerous impurity may be found in it?

A.—Hydrocyanic acid.

Q.—To what class of compounds does **Eugenol** belong?

A.—Phenols.

Q.—Give the official definition.

A.—An unsaturated aromatic phenol obtained from oil of clove and from other sources. Preserve in well-closed containers, in a cool place, protected from light.

Q.—What can you say of its solubility?

A.—Soluble in 2 volumes of 70% alcohol, miscible with alcohol, chloroform, ether and fixed oils.

Q.—What is the chemical formula?

A.—$C_6H_3(C_3H_5)(OCH_3)(OH)$ 1:3:4.

Q.—What is it therapeutically?

A.—Stimulant and counterirritant.

Q.—What is the dose?

A.—0.3 mils.

Q.—What is the chemical name for **Anethol?**

A.—Para-propenyl-anisol.

Q.—What other chemical name is applied to it?

A.—The methyl ether of the phenol of allyl-benzene.

Q.—Give the official definition.

A.—The methyl ether of para-propenyl phenol. It is the principal constituent of the oils of anise, star anise and fennel and is usually obtained from these by fractioning, chilling and crystal-

lizing. Preserve it in well-stoppered, amber-colored bottles protected from the light and air.

Q.—Is it a liquid?
A.—Yes, but it will solidify at 20° to 21°C., however it remelts at 23°C.

Q.—Is it optically active?
A.—If absolutely pure it is inactive, but if traces of the oil from which it is derived are present it may be slightly active.

Q.—What will the activity amount to?
A.—Not more than 0.08°.

Q.—Is it then dextro or lævorotatory?
A.—Lævo if prepared from oil of anise, dextro if prepared from oil of fennel.

Q.—What can you say of its solubility?
A.—Almost insoluble in water, soluble in chloroform, ether and in 2 volumes of alcohol.

Q.—What is the dose?
A.—0.2 mil.

Q.—Where is Anethol official?
A.—In the National Formulary.

Q.—What is the synonym for **Oleum Hyoscyami Compositum?**
A.—Balsamum Tranquillans.

Q.—What does it contain?
A.—0.2% each of oil of lavender, peppermint, rosemary, thyme, then sufficient infused oil of hyoscyamus to make 100%.

Q.—What is its use?
A.—Used as an anodyne application, frequently in earache.

OLEORESINS

Q.—Define Oleoresins.
A.—Natural vegetable exudations consisting of a mixture of volatile oil and resin.

Q.—What other class of products is also called oleoresin?
A.—The pharmaceutical or pharmacopœial oleoresins which are made by extracting oleoresinous drugs with ether.

Q.—What happens when the oleoresin is heated?
A.—The volatile oil separates, leaving the resin as a residue.

Q.—Name the official oleoresins.
A.—Copaiba, Pix Liquida, Terebinthina, Terebinthina Laricis.

Q.—Give the official definition for **Copaiba.**
A.—An oleoresin derived from South American species of Copaiba.

Q.—What are the synonyms for Copaiba?
A.—Balsam of Copaiba; Copaiva.

Q.—Why is it not a Balsam?
A.—Because it contains neither benzoic nor cinnamic acid.

Q.—What is its specific gravity?
A.—0.94 to 0.995.

Q.—What can you say of its solubility?
A.—Insoluble in water, partly soluble in alcohol, soluble in dehydrated alcohol, carbon disulphide and in fixed and volatile oils.

Q.—What is the test for the presence of turpentine oil?
A.—When heated on the water-bath no odor of turpentine should be given off.

Q.—What is the test for the presence of paraffin or fatty oils?
A.—After driving off all the volatile oil, a hard brittle resin remains weighing not less than 36% of the original copaiba taken.

Q.—Name the commercial varieties.
A.—Para, Maranham, Rio Janeiro, Maracaibo.

Q.—What is said to be the valuable therapeutic constituent of the oleoresin?
A.—The volatile oil.

Q.—Which commercial variety contains the most oil?
A.—The Para.

Q.—Which variety contains the greater proportion of resin?
A.—The Maracaibo.

Q.—Name three N. F. preparations of Copaiba.
A.—Mistura Copaibæ, 12.5%, Mistura Copaibæ et Opii 25%, Massa Copaibæ, 94%.

Q.—What is the synonym for Mist. Copaibæ?
A.—Lafayette mixture.

Q.—What is Copaiba therapeutically?
A.—Antiseptic, stimulant, diuretic, expectorant.

Q.—Give the official definition for **Terebinthina.**
A.—A concrete oleoresin obtained from Pinus palustris and from other species of Pinus.

Q.—What is it commonly called?
A.—Gum turpentine.

Q.—Into what official preparation does it enter?
A.—Ceratum Resinæ Compositum.

Q.—What two official products does it yield when distilled?
A.—Oleum Terebinthinæ and Resina.

Q.—In what proportion are these present in the oleoresin?
A.—About 30% volatile oil, and 70% resin.

Q.—What is it therapeutically?
A.—Stimulant and diuretic.

Q.—What is the official definition for **Terebinthina Laricis?**
A.—A viscid oleoresin obtained from Larix europœa.

Q.—What is the English title for it?
A.—Venice turpentine.

Q.—What is the synonym?
A.—Larch turpentine.

Q.—Into what official preparation does it enter?
A.—Petroxolinum Terebinthinæ Laricis.

RESINS

Q.—What three classes of resins are found in pharmacy?
A.—(1) Those made by extraction. (2) Residues left after distilling off volatile oil from oleoresins. (3) Natural exudations.

Q.—What classes are we now considering?
A.—Natural resins and those left after distilling off volatile oil.

Q.—What are the elemental constituents of resins?
A.—Carbon, hydrogen, and oxygen.

Q.—What can you say of the solubility of resins?
A.—They are insoluble in water but soluble in alcohol, ether and benzene.

Q.—What reaction do their solutions show toward indicators?
A.—Acid.

Q.—What important test, based on this characteristic, is used to determine the identity and purity of resins?
A.—The determination of the acid number.

Q.—Just what does this mean?
A.—Finding the weight of potassium hydroxide which a definite weight of the resin will neutralize.

Q.—Define "**Acid Number**" as applied to resins.
A.—The number of milligrams of absolute potassium hydroxide required to exactly neutralize 1 Gm. of the resin examined.

Q.—Where is this test method described?
A.—Page 591 U. S. P.

Q.—What general description may be given to resins?
A.—They are solid amorphous vegetable substances, having a conchoidal fracture, acid reaction, insoluble in water but soluble in alcohol.

Q.—Name the official Resins.
A.—Resina, Guaiacum, Mastiche.

Q.—Give the official definition for **Resina.**
A.—The residue left after distilling the volatile oil from the concrete oleoresin obtained from Pinus palustris and from other species of Pinus.

Q.—What is its English name?
A.—Rosin.

Q.—What is the synonym?
A.—Colophony.

Q.—What is the acid number of Rosin?
A.—Not less than 150.

Q.—What is it therapeutically?
A.—Stimulant.

Q.—What is it generally used for in pharmacy?
A.—To give a firmer consistence to plasters and cerates.

Q.—What other use is made of it in the pharmacy?
A.—Mixed with yellow wax, it is used to cement pestle handles and to fix glass labels to shelf bottles.

Q.—Give the official definition for **Guaiacum.**
A.—The resin of the wood of Guaiacum officinale or of Guaiacum sanctum.

Q.—What is the color?
A.—Greenish-gray brown when in pieces, the powder becomes green on exposure to the air.

Q.—How much of the Guaiac must be alcohol-soluble?
A.—85%.

Q.—What peculiar color change will be seen in aqueous mixtures of Guaiac?
A.—Within 24 hours after preparation, they will turn blue.

Q.—At what temperature should Guaiac melt?
A.—Between 85° and 90°C.

Q.—What is the test for the presence of Rosin?
A.—Macerate with petroleum benzin for 3 hours, filter, the filtrate should be colorless and should show no green color on the addition of cupric acetate T. S.

Q.—What is it therapeutically?
A.—Diaphoretic, stimulant, alterative.

Q.—What is the dose?
A.—1 Gm.

Q.—Give the official definition for **Mastiche.**
A.—A concrete resinous exudation from Pistacia Lentiscus.

Q.—What is its acid number?
A.—Not less than 65.

Q.—What is the dose?
A.—2 Gm.

GUM-RESINS

Q.—What are gum-resins?
A.—Natural vegetable exudations consisting of gum and resin, some with and some without volatile oil.

Q.—What can you say of the solubility of these?
A.—The gum which they contain is soluble in water, but not in alcohol, while the resin is soluble in alcohol but not in water.

Q.—What class of preparations results from trituration of gum-resins with water?
A.—Emulsions, there is usually sufficient gum present which when dissolved in water, will suspend the resin.

Q.—Name the official gum-resins.
A.—Asafetida, Myrrh, Gamboge.

Q.—Which of these contain volatile oil?
A.—Asafetida and myrrh.

Q.—Give the official definition for **Asafetida.**
A.—The gum-resin obtáined by incising the rhizomes and roots Ferula Asafetida and Ferula fetida and of some other species of Ferula, indigenous to Persia and adjacent countries and yielding not less than 60% (or if powdered 50%) of alcohol-soluble constituents.

Q.—What is the valuable constituent of Asafetida?
A.—The volatile oil.

Q.—To what constituent is the odor due?
A.—The volatile oil.

Q.—Which is the better form for medicinal preparations, the tears or powder?
A.—The tears.

Q.—Why are the tears better?
A.—Because the asafetida must be heated or frozen in order that it may be powdered and this deprives it of the volatile oil.

Q.—How does the U. S. P. say the powder is prepared?
A.—By drying over freshly burned lime or exposure to currents of warm air until it ceases to lose weight, then reduced to low temperature and powdered.

Q.—What does the U. S. P. direct to be added to maintain it in a powdered form?
A.—Starch or magnesium carbonate.

Q.—How is the assay carried out?
A.—Reflux the gum-resin with 10 times as much alcohol for an hour. Filter and transfer the residue to the filter. Wash with divided portions of hot alcohol until a drop of the filtrate in water no longer produces cloudiness. Dry filters and flask to constant weight at 115°C. The residue should not be more than 40% of the original.

Q.—What is the limit of ash?
A.—Not more than 30% for the powdered.

Q.—What is it therapeutically?
A.—Antispasmodic, carminative, stimulant.

Q.—What is the dose?
A.—0.250 Gm.

Q.—Name the preparations.
A.—U. S. P., emulsion, pills, tincture. N. F. mist. magnesia, asafetida and opium; pills aloes and asafetida.

Q.—Give the official definition for **Myrrha.**
A.—A gum-resin obtained from one or more species of Commiphora.

Q.—Where is it native?
A.—Northeastern Asia.

Q.—What percentage must be alcohol soluble?
A.—Not less than 35%.

Q.—What is the ash limit?
A.—Not more than 8.5%.

Q.—What is it therapeutically?
A.—Stimulant and expectorant.

Q.—What is the dose?
A.—0.5 Gm.

Q.—Name the official preparations.
A.—U. S. P., pill rhubarb compound, tincture. N. F. mist. iron compound, pill aloes and myrrh, antiperiodic pills, tinct. aloes and myrrh, tinct. antiperiodic, tinct. capsicum and myrrh.

Q.—Give the official definition for **Cambogia.**
A.—A gum-resin obtained from Garcinia Hanburii.

Q.—What is the English title?
A.—Gamboge.

Q.—What is the synonym?
A.—Pipe gamboge.

Q.—Where is it native?
A.—India, especially Siam.

Q.—What color is it when powdered?
A.—Bright yellow.

Q.—What percentage must be alcohol-soluble?
A.—Not less than 65%.

Q.—What is the limit of ash?
A.—Not more than 2%.

Q.—What is it therapeutically?
A.—Drastic hydrogogue cathartic.

Q.—Is it usually prescribed alone?
A.—No, never, always in combination.

Q.—What is the dose?
A.—0.125 Gm.

Q.—Into what preparation does it enter?
A.—Compound cathartic pills.

BALSAMS

Q.—Define Balsam.
A.—A natural vegetable product which contains benzoic or cinnamic acid or both in addition to resin, gum or volatile oil.

Q.—Name the official Balsams.
A.—Benzoinum, Balsamum Peruvianum, Styrax, Balsamum Tolutanum.

Q.—Give the official definition for **Benzoinum.**
A.—A balsamic resin obtained from Styrax Benzoin and some other species of Styrax growing in the East Indies and known in commerce as Sumatra Benzoin and Siam Benzoin.

Q.—Which has more alcohol-soluble matter, Sumatra or Siam?
A.—The Siam has 90%, while the Sumatra has only 75%.

Q.—What is the ash limit?
A.—For Sumatra 2.5%, for Siam 2%.

Q.—Is Benzoin water-soluble?
A.—No.

Q.—What official acid is obtained from Benzoin?
A.—Benzoic acid.

Q.—What is the synonym for **Benzoin?**
A.—Gum Benjamin.

Q.—What is it therapeutically?
A.—Stimulant, expectorant, antiseptic.

Q.—What is the dose?
A.—1 Gm.

Q.—Name its official preparations.
A.—Tr. benzoin; comp. tr. benzoin.

Q.—Give the official definition for **Balsamum Peruvianum.**
A.—A balsam obtained from Toluifera Pereiræ.

Q.—Where is it native?
A.—Central America. (San Salvador.)

Q.—What is its consistence?
A.—It is a thick viscid liquid.

Q.—Does it harden on exposure to air?
A.—No.

Q.—What can you say of its solubility?
A.—Not soluble in water; soluble in alcohol, chloroform, and glacial acetic acid.

Q.—What is it therapeutically?
A.—Stimulant, expectorant.

Q.—What is its acid number?
A.—Not less than 56 nor more than 84.

Q.—Give the official definition for **Balsamum Tolutanum.**
A.—A balsam obtained from Toluifera Balsamum.

Q.—Where is it native?
A.—South America (Peru, Venezuela).

Q.—What is its consistence?
A.—A plastic solid when fresh, becoming brittle when older.

Q.—What can you say of its solubility?
A.—Insoluble in water or petroleum benzin, soluble in alcohol, chloroform and ether.

Q.—What is its acid number?
A.—Not less than 112 nor more than 168.

Q.—What impurities may be found in it?
A.—Rosin and copaiba.

Q.—What is it therapeutically?
A.—Stimulant, expectorant.

Q.—What further use is made of it in pharmacy?
A.—Used to coat the officially coated pills.

Q.—Name the official preparations.
A.—Syrup, tincture; tr. benzoin comp.

Q.—Give the official definition for **Styrax.**
A.—A balsam obtained from the wood and inner bark of Liquid ambar orientalis.

Q.—Where is it native?
A.—Asia Minor.

Q.—What is its consistence?
A.—Semi-liquid.

Q.—What can you say of its solubility?
A.—Insoluble in water but soluble in equal weight of warm alcohol.

Q.—What is its acid number?
A.—Not less than 56 nor more than 85.

Q.—What is it therapeutically?
A.—Stimulant, expectorant.

Q.—What is the dose?
A.—1 Gm.

Q.—Name the official preparation.
A.—Tr. benzoin comp.

Q.—What official acid is obtained from a balsam?
A.—**Acidum Benzoicum.**

Q.—Give the official definition for Acidum Benzoicum.
A.—An organic acid obtained from benzoin or prepared synthetically. It contains when dried to constant weight in a desiccator over sulphuric acid, not less than 99.5% C_6H_5COOH. Preserve in well-closed containers, in a cool place, protected from light.

Q.—How is it prepared synthetically?
A.—From toluene, which is first treated with chlorine to form $C_6H_5CCl_3$; this is then boiled with water to form a molecule of benzoic acid and three of hydrochloric acid. It can also be made from hippuric acid and from naphthalene.

Q.—How is it obtained from Benzoin?
A.—By sublimation.

Q.—What is the solubility?
A.—275 parts of water; 2.3 parts of alcohol.

Q.—What is it therapeutically?
A.—Antiseptic, antizymotic.

Q.—What use is made of it in foodstuffs and fountain syrups?
A.—Added to these to prevent fermentation.

Q.—Is the acid itself generally used?
A.—No, usually one of its salts as sodium benzoate.

Q.—Is such lawful?
A.—A limited quantity may be used, if its presence is noted on label.

Q.—What is the test for the presence of benzoate?
A.—To an aqueous extraction of the substance, add ferric chloride T. S. and a flesh colored precipitate will form.

Q.—What impurities does the U. S. P. give tests for?
A.—Readily carbonizable products, chlorine, cinnamic acid.

Q.—What is the dose?
A.—0.5 Gm.

Q.—What official preparation does it enter?
A.—Tr. opium camph.

TANNINS

Q.—What are the elemental constituents of **Tannin**?
A.—C, H, O.

Q.—What is its chemical formula?
A.—$C_{13}H_9O_7COOH$.

Q.—By what other names is it known?
A.—Gallo tannic acid; digallic acid, tannin.

Q.—What is its source?
A.—From nutgalls.

Q.—How is it obtained?
A.—The nutgalls are first exhausted with water, then this watery solution is shaken with ether to remove the coloring matter, resins, and oils. This ethereal layer is rejected and the aqueous fluid is concentrated and dried.

Q.—Is this the only method of preparation?
A.—No, the other methods are extraction with water and with alcohol.

Q.—Describe **tannic acid.**

A.—A light yellowish amorphous powder, odorless and strongly astringent.

Q.—What can you say of its solubility?

A.—Soluble in 0.34 parts of water; 0.23 parts of alcohol and in 1 part of glycerin; insoluble in ether.

Q.—What is its action with Ferric solutions?

A.—Produces a bluish-black color or precipitate.

Q.—How does it behave with Limewater?

A.—On adding a small quantity of lime water to a weak aqueous solution of tannin, a bluish-white, flocculent precipitate is produced which is not dissolved on shaking. A moderate excess of limewater makes the precipitate more copious and a deeper blue and a large excess imparts a pink color to the mixture.

Q.—What is its reaction with alkaloids?

A.—Forms precipitates with them.

Q.—How does it react with gelatin and albumen?

A.—Forms insoluble compounds with them.

Q.—Is tannic acid found in substances other than nutgalls?

A.—Yes, notably in oak bark, chestnut wood, kino, pomegranate bark, gambir, sumac and in fact nearly every organic drug contains it to a greater or less extent.

Q.—How may the different ones be identified?

A.—Different colorations and precipitates with Ferric chloride T. S.; limewater; ammonium hydroxide; bromine water.

Q.—Into what two general classes are the tannins divided?

A.—Into physiological and pathological tannins.

Q.—What is meant by physiological tannins?

A.—Those which develop in the natural growth of the healthy plant.

Q.—What are pathological tannins?

A.—Those which develop as the result of an injury to the plant.

Q.—What is tannin therapeutically?

A.—Astringent.

Q.—What preparations are official?
A.—Glycerite, troches, ointment and styptic collodion.

Q.—How is tannin broken up when taken into the system?
A.—It is converted into gallic acid.

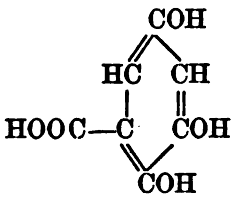
Q.—What technical use is made of tannin?
A.—Used in making leather; as a mordant in dyeing and in the manufacture of ink.

Q.—What is the dose of tannic acid?
A.—0.5 Gm.

Q.—Give the official definition.
A.—A tannin usually obtained from nutgalls. Preserve it in well-closed containers, protected from light.

Q.—Define **Acidum Gallicum.**
A.—An organic acid.

Q.—Give the chemical formula for Gallic Acid.
A.—$C_6H_2(OH)_3COOH + H_2O$.



Q.—By what other chemical names is Gallic Acid called?
A.—Trihydroxybenzoic acid; dihydroxysalicylic acid.

Q.—What is the method for obtaining Gallic Acid?
A.—Tannic acid is boiled with dilute sulphuric acid; the mixture is strained and set aside to cool and to permit crystals to form. These are redissolved in hot water, decolorized with animal charcoal. The solution is filtered and again set aside to crystallize.

Q.—Is it always necessary that it be made from Tannic acid?
A.—No, it may be made from nutgalls by the same treatment.

Q.—Describe Gallic Acid.
A.—It occurs in white or fawn-colored, silky, interlaced needles or triclinic prisms: odorless: having an astringent and slightly acidulous taste: permanent in the air.

Q.—Give its solubility.

A.—Soluble in 4.6 parts of alcohol; 87 parts of water; 10 parts of glycerin; 100 parts of ether.

Q.—How does Gallic acid affect ferrous salts?

A.—It neither colors nor precipitates pure ferrous salts.

Q.—How does it affect ferric salts?

A.—It forms a bluish-black precipitate.

Q.—How does Gallic Acid react with Limewater?

A.—On adding some limewater to a cold saturated solution of Gallic Acid, a bluish-white precipitate will form where the lime solution is in temporary excess, but disappears on shaking. When an excess has been added the precipitate no longer disappears and the mixture becomes blue or green, and when a large excess of limewater has been added it acquires a pink color.

Q.—How does Gallic Acid react with alkaloids?

A.—It does not precipitate alkaloids.

Q.—How does it react with gelatin and albumin?

A.—Does not precipitate with them.

Q.—How does it act with salts of Gold and Silver?

A.—Reduces them.

Q.—What is it therapeutically?

A.—Astringent.

Q.—Is it more or less astringent than Tannic Acid?

A.—Less.

Q.—What is the dose?

A.—1 Gm.

PYROGALLOL

Q.—Give the official definition for **Pyrogallol.**

A.—Trihydroxybenzene. Preserve it in well-closed containers protected from light.

Q.—What is the chemical formula?

A.—$C_6H_3(OH)_3$ 1:2:3.

Q.—What is the synonym?

A.—Pyrogallic acid.

Q.—How is it prepared?

A.—By carefully heating Gallic Acid.

Q.—To what class of compounds does it belong?
A.—Phenols. It is a triatomic phenol.

Q.—Give its solubility.
A.—1.7 parts of water; 1.3 parts of alcohol.

Q.—Is it poisonous?
A.—Yes.

Q.—What is its principal use?
A.—A developing agent in photography.

Q.—Why is it a good developer?
A.—Because it is a reducing agent.

Q.—What other use is made of it?
A.—It is a constituent of many hair dyes.

Q.—Is it ever used medicinally?
A.—Yes, in the treatment of some skin diseases, usually in the form of an ointment.

GLUCOSIDES

Q.—What are glucosides?
A.—Vegetable bodies, which when treated with ferment or dilute acid split into glucose and some other body different from the original.

Q.—What is the chemical formula for Glucose?
A.—$C_6H_{12}O_6$.

Q.—Do all the so-called glucosides yield exactly this carbohydrate?
A.—No, not exactly but very similar.

Q.—What are the elemental constituents of glucosides?
A.—All have C-H-O, some contain in addition N, while others have S.

Q.—Name a well-known glucoside which contains nitrogen.
A.—Amygdalin. $C_{20}H_{27}NO_{11}$.

Q.—Name one containing sulphur.
A.—Sinigrin. $C_{10}H_{16}KO_9NS_2$.

Q.—What is the reaction of glucosides toward indicators?
A.—They are acid or neutral, if they form salts at all they form them with bases.

Q.—How do neutral principles differ from glucosides?
A.—They are neutral in reaction and are not converted into glucose.

Q.—When the glucosides are decomposed, what is the term used to indicate such decomposition?
A.—Hydrolysis.

Q.—Just what is done?
A.—The elements of one or more molecules of water are introduced, by the action of the ferment or acid.

Q.—In naming glucosides, what letters do the names end with?
A.—In English "in", in Latin "inum".

Q.—Name the official true glucosides.
A.—Strophanthin, salicin.

Q.—What can you say of the solubility of true glucosides?
A.—They are quite soluble in water.

Q.—Give the official definition for **Salicinum.**
A.—A glucoside obtained from several species of Salix and Populus. Preserve it in well-closed containers.

Q.—What is Salix commonly called?
A.—Willow.

Q.—What is its solubility?
A.—23.5 mils of water; 88.5 mils alcohol.

Q.—What is it therapeutically?
A.—Febrifuge and antirheumatic.

Q.—What is the dose?
A.—1 Gm.

Q.—Give the official definition for **Strophanthinum.**
A.—A glucoside or a mixture of glucosides obtained from Strophantus Kombe. Preserve it in well-closed containers, protected from the light.

Q.—What can you say of its solubility?
A.—Very soluble in water and in diluted alcohol; insoluble in chloroform and ether.

Q.—What is it therapeutically?
A.—Heart tonic.

Q.—What is the dose?
A.—By mouth 0.001 Gm., intravenous 0.00075 Gm.

Q.—What does the U. S. P. direct about tasting it?
A.—To be tasted with great caution and only when in highly diluted solution.

Q.—The therapeutic action of Strophanthin is similar to what more common drug?
A.—Digitalis.

NEUTRAL PRINCIPLES

Q.—Give the official definition for **Chrysarobinum.**
A.—A mixture of neutral principles extracted from Goa powder, a substance found deposited in the wood of Vouacapoua Araroba. Preserve it in well-closed containers protected from light..

Q.—By what other name is Goa powder called?
A.—Araroba.

Q.—How does Goa powder get its name?
A.—Because it was originally shipped from South America to the province of Goa in the East Indies.

Q.—What can you say of its solubility?
A.—Very slightly soluble in water; 385 parts of alcohol; 12.5 parts of chloroform; 16 of ether.

Q.—Is it the same thing as chrysophanic acid?
A.—No, there are two tests given in the U. S. P. to distinguish it from chrysophanic acid.

Q.—What is it therapeutically?
A.—Parasiticide.

Q.—In what particular trouble is it much used?
A.—Psoriasis.

Q.—Name the official preparation.
A.—Unguentum Chrysarobini.

Q.—Give the official definition for **Elaterinum.**
A.—A principle obtained from elaterium, a substance deposited by the juice of the fruit of Ecballium Elaterium.

Q.—What can you say of its solubility?
A.—Insoluble in water; soluble in 325 parts of alcohol, 15.5 parts of chloroform.

Q.—What is it therapeutically?
A.—Hydragogue cathartic.

Q.—What is the dose?
A.—0.003 Gm.

Q.—What preparation is official?
A.—Trituratio Elaterini.

Q.—In what particular trouble is it used?
A.—Dropsy.

Q.—Give the official definition for **Santoninum.**
A.—The inner anhydride or lactone of satonic acid, obtained from Artemisia pauciflora. Preserve it in well-closed containers, protected from light.

Q.—What is meant by "inner anhydride"?
A.—The product resulting from the rearrangement of the molecule of acid in such manner that the elements of a molecule of water are split off.

Q.—Why is it called "lactone"?
A.—Because the above reaction was first observed with lactic acid.

Q.—What can you say of its solubility?
A.—Very slightly soluble in water; soluble in 43 mils alcohol; 1.7 mils chloroform; 110 mils ether.

Q.—What effect does light have on it?
A.—Causes it to turn yellow.

Q.—How may it be restored to its original color?
A.—By recrystallization from alcohol.

Q.—What is it therapeutically?
A.—Anthelmintic.

Q.—What is the dose?
A.—0.06 Gm.

Q.—What peculiar effect is it likely to have on vision?
A.—May cause everything to appear yellow.

Q.—At what time is it best administered to children?
A.—At bed-time, for the effect of the yellow vision will have worn off by morning.

Q.—What effect might an overdose have?
A.—Has been known to cause blindness.

Q.—What is the objection to the use of sodium santoninate?
A.—It is so soluble that poisonous quantities may be absorbed from the intestines.

Q.—What is the objection to castor oil as a purgative following the administration of santonin?
A.—The oil has a solvent action on it and may cause sufficient absorption to give toxic effect.

Q.—What preparations are official?
A.—Troches and comp. troches.

PENTOSIDE

Q.—What is a **pentoside?**
A.—A body similar to a glucoside or neutral principle but which yields as one of its decomposition products a five carbon atom sugar instead of glucose.

Q.—What is the official pentoside?
A.—**Aloinum.**

Q.—Give the official definition for Aloinum.
A.—A pentoside or a mixture of pentosides obtained from aloes, varying in chemical composition, physical and chemical properties according to the source. Preserve in well-closed containers, protected from light.

Q.—What can you say of its solubility?
A.—It is soluble in water, alcohol, and acetone.

Q.—What is it therapeutically?
A.—Laxative.

Q.—What is the dose?
A.—0.015 Gm.

Q.—Name the official preparations.
A.—Pills of aloin comp., pills of aloin, strychnine and belladonna; pills of aloin, strychnine and belladonna compound.

REACTIONARY DRUGS

Q.—What are reactionary drugs?

A.—Those drugs which depend for their activity, upon constituents not residing naturally in the drug, but which are developed by reaction between a ferment and a glucoside in the presence of moisture.

Q.—Are the ferment and glucoside found naturally in the drug?

A.—Yes.

Q.—Name the official reactionary drugs.

A.—Prunus Virginiana, Sinapis Nigra, Sinapis Alba.

Q.—Name a well-known unofficial reactionary drug.

A.—Bitter Almond. Amygdala Amara.

Q.—What are the reactionary agents in Bitter Almond?

A.—The glucoside amygdalin and the ferment emulsin.

Q.—What is necessary to start reaction?

A.—Water.

Q.—What products are formed through the reaction?

A.—Hydrocyanic acid, benzaldehyde and glucose.

Q.—Is the ferment destroyed in the reaction?

A.—No.

$$C_{20}H_{27}NO_{11} + 2\ H_2O + \text{emulsin} = 2\ C_6H_{12}O_6 + HCN + C_6H_5COH + \text{emulsin.}$$

Q.—What are the reactionary agents in **Wild Cherry?**

A.—Exactly the same as in Bitter Almond.

Q.—What are the reactionary agents in **Black Mustard?**

A.—A glucoside sinigrin, chemically potassium myronate, and a ferment myrosin.

Q.—What are the products of reaction?

A.—Allyl iso-thiocyanate, glucose and potassium bisulphate.

$$C_{10}H_{16}KO_9NS_2 + H_2O + \text{Myrosin} = C_3H_5CSN + KHSO_4 + C_6H_{12}O_6$$

Q.—What are the reactionary agents in **White Mustard?**

A.—A glucoside sinalbin, $C_{30}H_{44}N_2S_2O_{16}$ and a ferment myrosin.

Q.—What are the products of the reaction?

A.—Acrinyl sulphocyanate, sinapin bisulphate, glucose.

Q.—Name the official preparations of Prunus Virginiana.
A.—Infusion, syrup, wine, ferrated wine, fluidextract.

ALKALOIDS

Q.—Define **alkaloids.**
A.—Active principles of vegetable drugs which give off ammonia when heated with an alkali.

Q.—What are the elemental constituents of alkaloids?
A.—Carbon, hydrogen, nitrogen and usually oxygen.

Q.—Why is the name "alkaloid" applied to these principles?
A.—The suffix "oid" means "like" and these principles are like alkalies, forming salts with acids and their solutions turn litmus blue.

Q.—What is the physical difference between those alkaloids which do contain oxygen and those which do not contain oxygen?
A.—Those which do not contain oxygen are generally liquid.

Q.—Name some of the liquid alkaloids.
A.—Nicotine, lobeline, coniine and sparteine.

Q.—In what letters do the Latin and English titles for alkaloids end?
A.—English in "ine" and Latin in "ina."

Q.—What group name is given to the liquid alkaloids?
A.—**The amines.**

Q.—What group name is given to the solid alkaloids?
A.—**The amides.**

Q.—In what part of the plant do alkaloids reside?
A.—They may be found in all parts.

Q.—In what parts are they mostly found in those plants which are herbs?
A.—The seeds and leaves.

Q.—In what parts of trees are they usually found?
A.—In the bark.

Q.—In what form do they exist in plant parts?
A.—Nearly always in combination with a natural acid.

Q.—What acids are they most frequently in combination with?
A.—Tannic, citric or malic.

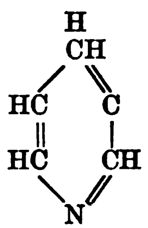
Q.—What is the acid in opium?
A.—Meconic acid.

Q.—What is the acid in Cinchona?
A.—Quinic acid.

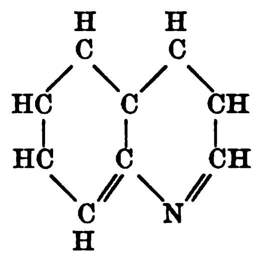
Q.—What is the acid in Nux Vomica?
A.—Igasuric acid.

Q.—What name is given to alkaloids which form in decaying animal tissue?
A.—Ptomaines, formerly cadaveric alkaloids.

Q.—Chemically, what are the alkaloids considered?
A.—Derivatives of pyridine and quinoline.



pyridine. C_5H_5N



quinoline. C_9H_7N

Q.—How are alkaloids usually extracted?
A.—Generally with acidulated water or with alcohol.

Q.—Why is acid used?
A.—To break up the acid combination in which the alkaloid naturally exists.

Q.—How is the free alkaloid obtained?
A.—Usually precipitated from its acid solution with an alkali.

Q.—How are the alkaloids purified?
A.—Redissolved in the appropriate solvent and filtered through animal charcoal, then crystallized.

Q.—What can you say of the relative solubility of the free alkaloids and their salts?
A.—The free alkaloid is not usually water-soluble but is soluble in alcohol and generally very soluble in chloroform. The salts are usually quite soluble in water, somewhat less soluble in alcohol, but most of them are insoluble in ether and chloroform.

Q.—How should they be kept?
A.—In tightly stoppered bottles protected from light.

Q.—How does light affect them?
A.—Causes them to darken.

Q.—How does tannic acid affect alkaloids?
A.—It combines with them, forming insoluble compounds.

Q.—In what particular is such reaction of value?
A.—As an antidote for alkaloidal poisoning.

Q.—What is Mayer's Solution?
A.—A solution of mercuric potassium iodide, an alkaloidal precipitant.

Q.—How many kinds of **Cinchona Bark** are official?
A.—Two.

Q.—What are they?
A.—Cinchona and Cinchona Rubra.

Q.—What are they commonly called?
A.—Cinchona is commonly known as yellow cinchona, and cinchona rubra as red cinchona.

Q.—What other common name is applied to these barks?
A.—Peruvian bark.

Q.—What is the pharmacopœial requirement of Cinchona?
A.—It must contain when assayed by the official process not less than 5% of cinchona alkaloids.

Q.—What are the pharmacopœial requirements of **Cinchona Rubra?**
A.—It must contain not less than 5% of Red Cinchona alkaloids when assayed by the official process.

Q.—What are the ether-soluble alkaloids of Cinchona?
A.—Quinine, quinidine and cinchonidine.

Q.—Name the principal alkaloids extracted from Cinchona.
A.—Quinine, quinidine, cinchonine and cinchonidine.

Q.—Are any of the salts of **Quinidine** official?
A.—No.

Q.—Is Quinidine itself official?
A.—Yes.

Q.—What salt of **Cinchonidine** is official?
A.—The sulphate.

Q.—What salt of **Cinchonine** is official?
A.—The sulphate.

Q.—Is the alkaloid **Quinine** official?
A.—Yes.

Q.—What salts of quinine are official?
A.—Bisulphate.
Dihydrochloride.
Quinine and Urea Hydrochloride.
Hydrobromide.
Hydrochloride.
Salicylate.
Sulphate.
Tannate.
Glycerophosphate.
Hypophosphite.
Valerate.

Q.—What are these therapeutically?
A.—Tonic and antiperiodic, antimalarial.

Q.—What is the general dose?
A.—Tonic 0.1 Gm., antimalarial, at least 1 Gm. daily.

Q.—Which salt is the most soluble?
A.—The dihydrochloride, 0.6 mils water.

Q.—Which is the least soluble?
A.—The tannate.

Q.—Which has the largest average dose?
A.—The tannate.

Q.—Which is the most commonly dispensed?
A.—The sulphate.

Q.—What is its solubility in water?
A.—1 Gm. dissolves in 725 mils.

Q.—How may the sulphate be readily put into aqueous solution?
A.—By first mixing with water, then adding dilute sulphuric acid to the mixture, drop by drop.

Q.—What does it really do?
A.—Converts it into the bisulphate which is readily soluble.

Q.—Name two characteristics of solutions of quinine salts.
A.—They are fluorescent and develop thalleioquin.

Q.—What is the thalleioquin test?
A.—To an aqueous solution of the salt, one or two drops bromine T. S. are added, then an excess of ammonia water, when an emerald-green color will show.

Q.—What test is used to show absence of other alkaloids and their salts?
A.—Solubility in ammonia water.

Q.—Can this test be carried out quickly and roughly?
A.—No, the U. S. P. gives minute details for its use.

Q.—How is **Quinine and Urea Hydrochloride** administered?
A.—Hypodermically.

Q.—What effect does it have other than the ordinary quinine effect?
A.—Local anesthetic.

Q.—What is the dose?
A.—1 Gm.

Q.—What solvent is used to distinguish Cinchonine Sulphate from the other sulphates of the Cinchona alkaloids?
A.—Chloroform, it is much more soluble in chloroform than the other sulphates.

Q.—What test is used to distinguish quinine sulphate from morphine sulphate?
A.—0.1 Gm. of the salt in 2 mils of sulphuric acid is not colored red by the addition of a few drops of nitric acid.

Q.—Why are Quinine and its salts so valuable in malaria?
A.—They are specifics for the malaria germ.

Q.—Why must comparatively large doses be administered?
A.—If small doses are given, immunity to its action is developed.

Q.—How should it be dispensed in liquid mixtures?
A.—Mixed with fluidextract of licorice or elixir of glycyrrhiza.

Q.—Why should no attempt be made to get the quinine into solution when mixed with either of the above?

A.—An addition of acid would be required to make a solution and this would decompose the licorice.

Q.—What is "Herapathite"?

A.—A compound produced by adding iodine to an acid solution of the cinchona bases. Also called iodo-sulphate.

Q.—How many alkaloids are present in Cinchona?

A.—32.

Q.—What insoluble alkaloidal salt is sometimes formed in the course of prescription compounding?

A.—Quinine acetate.

OPIUM AND DERIVATIVES

Q.—Give the official definition for Opium.

A.—The air-dried milky exudation obtained by incising the unripe capsules of Papaver somniferum and its variety album and yielding in its normal moist condition, not less than 9.5% of anhydrous morphine.

Q.—By what name is this form of Opium usually called?

A.—Gum Opium.

Q.—How many forms of Opium are official?

A.—Four.

Q.—Name them.

A.—Opium; opium deodoratum; opium granulatum; opii pulvis.

Q.—What is the morphine strength of these additional forms?

A.—Not less than 10% nor more than 10.5% of anhydrous morphine.

Q.—What is **Opium Deodoratum** made from?

A.—The formula directs powdered opium, but it also says that granulated opium may be deodorized in the same way.

Q.—Why is it deodorized?

A.—To remove those constituents which are said to cause the bad after effects, headache and nausea, when opium is used.

Q.—How is it deodorized?

A.—By exhausting it with petroleum benzin.

Q.—If it is above strength, how does the U. S. P. direct that it be brought within limits?

A.—By the addition of some inert diluent or by the addition of deodorized opium of a lower strength.

Q.—What is the advantage in using **Granular Opium** in place of Powdered Opium for extractive preparations?

A.—The powdered is of such nature that it is most difficult to make the menstruum pass through the powdered but the granulated does not offer such obstruction.

Q.—How is Opium Granulatum prepared?

A.—It is dried at a temperature of not more than 70° C. then reduced to a coarse powder, No. 8 to 12.

Q.—How is it to be stored?

A.—In well-closed containers.

Q.—How is **Opii Pulvis** prepared?

A.—Opium is dried at a temperature not exceeding 70° C. then reduced to a very fine powder.

Q.—If it is too strong in morphine what is done with it?

A.—Mixed with powdered opium of a lower percentage strength or with some inert diluent, until it is brought within the U. S. P. limits.

Q.—What inert diluent is generally used?

A.—Sugar of milk.

Q.—How many alkaloids are present in Opium?

A.—About 19.

Q.—How many are official?

A.—Two.

Q.—What are they?

A.—Codeine and morphine.

Q.—What are some of the more important unofficial ones?

A.—Narcotine, narcine, thebaine, papaverine.

Q.—What menstruum is used in extracting Opium?

A.—Water.

Q.—How is it that only water is used here when alcohol or acidulated water is usually necessary to extract active constituents?

A.—The alkaloids are present in opium as sulphates or meconates which are water-soluble.

Q.—What is the outline of the Opium assay?

A.—8 Gm. of opium is extracted with water. Half of the liquid extract which has been treated with lime, is filtered then treated with alcohol, ether and ammonium chloride. The morphine which is separated is titrated with N/50 H_2SO_4 V. S.

Q.—Why is ether used in the assay?

A.—It keeps the other alkaloids in solution, but does not dissolve the morphine.

Q.—Why is the opium triturated with freshly slaked lime?

A.—It acts dissolvingly on the morphine, and leaves impurities undissolved which are filtered out.

Q.—What is Opium therapeutically?

A.—Narcotic, anodyne, antispasmodic.

Q.—What is the average dose?

A.—0.06 Gm.

Q.—What is the antidotal treatment for poisoning by Opium?

A.—Evacuate the stomach, to remove unassimilated opium. Give plenty of strong black coffee, the tannin in the coffee will form insoluble compounds with the alkaloids and the caffeine is stimulant. It is of the greatest importance that the patient be kept awake, if allowed to doze he is very likely not to wake again.

Q.—Are children more or less susceptible to Opium than adults?

A.—Much more susceptible.

Q.—What Federal Law restricts traffic in Opium and other narcotic drugs?

A.—The Harrison Narcotic Law.

Q.—Name the principal features of the law.

A.—No one may traffic in narcotics unless he is registered by the Internal Revenue Department. Special blanks are used to order narcotics. Strict record must be kept of all narcotics and these records open for the inspection of the proper authorities. Only proprietary medicines and U. S. P. and N. F. preparations containing not more than 2 grains of opium, or ½ gr. codeine, or ¼ gr. morphine or ⅛ gr. heroine in each fluid or apothecaries' ounce can be sold to the public. And only prescriptions containing opium or alkaloids in this way can be refilled. A prescription for these must have the physician's full name and registry number.

Q.—Which is the chief alkaloid of Opium?
A.—**Morphine.**

Q.—What is the solubility of Morphine?
A.—1 Gm. is soluble in 3340 parts of water; 210 mils of alcohol; 1220 mils of chloroform; 6250 mils of ether; 100 mils of lime-water.

Q.—How does Nitric Acid react with Morphine?
A.—Gives first an orange-red color fading to yellow.

Q.—What is the dose?
A.—0.008 Gm., or 1/8 gr.

Q.—What salts of Morphine are official?
A.—The hydrochloride and sulphate.

Q.—What is the solubility of **Morphine Hydrochloride?**
A.—1 Gm. in 17.5 mils of water; 52 mils alcohol; soluble in glycerin; insoluble in chloroform or ether.

Q.—What is the solubility of **Morphine Sulphate?**
A.—1 Gm. is soluble in 15.5 mils water; 565 mils alcohol, insoluble in chloroform or ether.

Q.—What is the dose of the salts of Morphine?
A.—The same as the alkaloid, 0.008 Gm., or 1/8 gr.

Q.—What is the antidotal treatment for Morphine poisoning?
A.—Exactly the same as for opium, which see.

Q.—Is a solution of the Alkaloid alkaline, acid or neutral to litmus?
A.—Alkaline.

Q.—What reaction does a solution of either of the salts show?
A.—Neutral or slightly acid.

Q.—Give the definition for **Æthylmorphinæ Hydrochloridum.**
A.—The hydrochloride of an alkaloid prepared from morphine by ethylation. Preserve it in well-closed containers, protected from the light.

Q.—What is the trade name for this "synthetic" salt?
A.—Dionin.

Q.—How is it prepared?
A.—By the reaction between ethyl iodide and morphine in the presence of an alkali.

Q.—What is its solubility?

A.—1 Gm. dissolves in 8 mils water; 22 mils alcohol; slightly soluble in ether or chloroform.

Q.—What advantages has it over Morphine or salts?

A.—Said not to produce constipation, nausea or lassitude.

Q.—What is the dose?

A.—0.015 Gm. or ¼ gr.

Q.—Give the official definition for **Diacetylmorphina.**

A.—An alkaloid prepared from Morphine by acetylization. Preserve it in well-closed containers, protected from the light.

Q.—What is the trade name for this substance?

A.—Heroin.

Q.—How is it made?

A.—By heating morphine with acetyl chloride, washing with alkali solution, then with water, finally crystallizing from alcohol.

Q.—How soluble is it?

A.—1 Gm. dissolves in 1700 mils of water; 31 mils of alcohol; 1.4 mils chloroform.

Q.—What salt of this alkaloid is official?

A.—The Hydrochloride.

Q.—Why is the salt preferable to the alkaloid?

A.—Because of its much greater solubility.

Q.—What is the solubility of **Diacetylmorphine Hydrochloride?**

A.—1 Gm. dissolves in 2 mils water; soluble in alcohol.

Q.—What particular use is made of this Hydrochloride?

A.—Used particularly as a cough-sedative.

Q.—What is the dose?

A.—0.003 or $\frac{1}{20}$ gr.

Q.—Is it a habit-forming drug?

A.—Yes, the habit is more difficult to overcome than morphine.

Q.—Give the official definition for **Codeina.**

A.—An alkaloid obtained from Opium or prepared from Morphine by methylation. Preserve in well-closed containers, protected from the light.

Q.—How is it made from Morphine?

A.—Treating morphine with a solution of potassium hydroxide and methyl iodide.

Q.—Give the solubility of Codeine.
A.—1 Gm. dissolves in 120 mils of water; 2 mils of alcohol; 0.5 mil chloroform; 18 mils ether.

Q.—What is Codeine therapeutically?
A.—Analgesic, and antibechic.

Q.—What is the dose?
A.—0.03 Gm., or ½ gr.

Q.—What salts of Codeine are official?
A.—The phosphate and the sulphate.

Q.—Which is the more soluble?
A.—The phosphate.

Q.—Give the official definition for **Codeine Phosphate.**
A.—The phosphate of the alkaloid Codeine. It yields not less than 67% of anhydrous codeine. Preserve it in well-closed containers, protected from the light.

Q.—Give the solubility of **Codeine Phosphate.**
A.—1 Gm. is soluble in 2.3 mils of water; 325 mils of alcohol; 4500 mils of chloroform; 1875 mils ether.

Q.—Give the solubility of **Codeine Sulphate.**
A.—1 Gm. dissolves in 30 mils of water; 1280 mils alcohol; insoluble in chloroform or ether.

Q.—What is the dose of the salts of Codeine?
A.—0.03 Gm., or ½ gr.

Q.—What chemical test distinguishes between Morphine and Codeine?
A.—An aqueous solution of potassium ferricyanide, to which a drop of ferric chloride T. S. has been added gives a blue color with a solution of Morphine but no color is produced with Codeine.

Q.—Give the official definition for **Apomorphinæ Hydrochloridum.**
A.—The hydrochloride of an alkaloid prepared from morphine by the abstraction of one molecule of water. Preserve it, protected from light, in small, well-stoppered vials, which have been previously rinsed with diluted hydrochloric acid and dried. Apomorphine Hydrochloride must be rejected if it at once imparts an emerald-green color to 100 parts of distilled water when shaken in a test tube.

Q.—How is it made?

A.—Usually by heating morphine or codeine for 2 or 3 hours at 149° C., in a sealed glass tube with 20 parts of pure hydrochloric acid. Cool and dilute the liquid in the tube with water, add sodium bicarbonate to precipitate the apomorphine. Treat this with ether or chloroform to which hydrochloric acid has been added when crystals will form.

Q.—Why must containers be rinsed with hydrochloric acid before placing apomorphine in them?

A.—To neutralize the alkalinity of the glass, as this is strongly enough alkaline to decompose the salt.

Q.—What can you say of its solubility?

A.—1 Gm. dissolves in 50 mils of water; 50 mils alcohol.

Q.—What is it therapeutically?

A.—Expectorant and emetic.

Q.—What is the dose?

A.—Expectorant 0.003 Gm., or 1/20 gr.; emetic, by mouth 0.01 Gm., or 1/6 gr., hypodermic 0.005 Gm., or 1/12 gr.

Q.—How is it generally administered for its emetic effect?

A.—Hypodermic injection.

Q.—Give the official definition for **Cotarninæ Hydrochloridum.**

A.—Quaternary oxymethyl-oxymethylene-dihydro-isoquinoline chloride, obtained by hydrolyzing narcotine and treating the resulting cotarnine with hydrochloric acid.

Q.—What is the trade name for this compound?

A.—Stypticin.

Q.—What is it therapeutically?

A.—Styptic, sedative, anodyne.

Q.—What is the dose?

A.—0.06 Gm., or 1 gr.

Q.—What is its solubility?

A.—Very soluble in water and alcohol.

NUX VOMICA, ALKALOIDS, DERIVATIVES

Q.—Give the official definition for **Nux Vomica.**

A.—The dried ripe seeds of Strychnos Nux vomica, yielding not less than 2.5% of the alkaloids of Nux Vomica.

Q.—What are the alkaloids of Nux Vomica?
A.—Strychnine and Brucine.

Q.—What are some of the common names for Nux Vomica?
A.—Gray buttons; dog buttons; Quaker buttons; Vomit nut.

Q.—What pharmaceutically troublesome constituent is found in Nux Vomica?
A.—A fixed oil.

Q.—Outline the assay process for Nux Vomica.
A.—Use 15 Gm. of the drug. Extract with 1 part chloroform and 2 parts ether. Precipitate the alkaloids with ammonia water. Dissolve the alkaloids which have been evaporated from chloroformic solution, in 10 mils N/10 H_2SO_4 V. S., then titrate the excess of acid with N/50 KOH V. S. Each mil of the tenth-normal acid consumed corresponds to 0.0364 Gm. alkaloids.

Q.—Name the official preparations of Nux Vomica.
A.—Extract, fluidextract, and tincture.

Q.—What is Nux Vomica therapeutically?
A.—Tonic and nerve stimulant.

Q.—What is the dose?
A.—0.06 Gm., or 1 gr.

Q.—What is the antidote for poisoning by Nux Vomica or Strychnine?
A.—Give tannin in some form to form an insoluble strychnine tannate, then an emetic.

Q.—What is the principal and characteristic symptom of Strychnine poisoning?
A.—Tetanic spasms.

Q.—How and why is Chloroform used as an antidote?
A.—In these spasms, respiration is suspended, hence the chloroform is administered to relax the muscles and restore respiration, otherwise the patient may die in one of the spasms.

Q.—Is Brucine official?
A.—No.

Q.—Is **Strychnine** official?
A.—Yes.

Q.—Give the official definition.

A.—An alkaloid obtained from nux vomica and obtainable from other seeds of the Loganiaceæ. Preserve it in well-closed containers.

Q.—What is the solubility of Strychnine?

A.—1 Gm. dissolves in 6420 mils of water; 136 mils of alcohol; 5 mils chloroform; very slightly soluble in ether.

Q.—What is the most characteristic physical property of Strychnine?

A.—Its very bitter taste, it is perceptible even in dilution of 1 in 700,000.

Q.—What salts of Strychnine are official?

A.—The nitrate, sulphate, glycerophosphate and valerate.

Q.—What is the solubility of **Strychnine Nitrate?**

A.—Soluble 1 Gm. in 42 mils of water; 150 mils alcohol; 50 mils glycerin; 105 mils chloroform.

Q.—What is the solubility of **Strychnine Sulphate?**

A.—1 Gm. dissolves in 32 mils water; 81 mils alcohol; 220 mils chloroform.

Q.—What is the solubility of **Strychnine Glycerophosphate?**

A.—1 Gm. dissolves in 350 mils water; 310 mils alcohol.

Q.—What is the solubility of **Strychnine Valerate?**

A.—It is only sparingly soluble in water, it becomes less soluble on keeping through loss of valeric acid. It is soluble in alcohol.

Q.—What is strychnine and its salts therapeutically?

A.—Nerve stimulant and tonic.

Q.—What is the dose of each of them?

A.—0.0015 Gm., or $\frac{1}{40}$ gr.

Q.—Is Brucine used in the practice of medicine?

A.—Yes.

Q.—How does it compare with Strychnine in activity?

A.—It is only $\frac{1}{12}$ as active.

Q.—What is the characteristic test for the identification of Strychnine?

A.—A drop of sulphuric acid in which there is a crystal of potassium dichromate will give a play of colors with strychnine, beginning with a deep blue and ending with orange or yellow.

Q.—What test serves to distinguish between Brucine and Strychnine?

A.—Nitric acid gives a red color with Brucine but does not change color with Strychnine.

MYDRIATIC ALKALOIDS AND THEIR SALTS

Q.—What is meant by a **mydriatic alkaloid?**

A.—An alkaloid which has the property of dilating the pupil of the eye.

Q.—What natural order in botany classification produces most of these?

A.—Solanaceæ.

Q.—Name the mydriatic alkaloids and salts.

A.—Atropine, atropine sulphate, hyoscyamine hydrobromide, scopolamine hydrobromide, homatropine hydrobromide.

Q.—Give the official definition for **Atropine.**

A.—An alkaloid obtained from belladonna and from other species of the Solanaceæ. Preserve it in well-closed containers, protected from light.

Q.—What is the solubility of Atropine?

A.—1 Gm. dissolves in 455 mils water; 2 mils alcohol; 27 mils glycerin; 420 mils chloroform; 3000 mils ether.

Q.—What is the solubility of **Atropine Sulphate?**

A.—1 Gm. dissolves in 0.4 mil water; 5 mils alcohol; 2.5 mils glycerin; 420 mils chloroform; 300 mils ether.

Q.—What is the alkaloid and its salt therapeutically?

A.—Sedative and mydriatic.

Q.—What is the dose?

A.—0.0005 Gm., or 1/120 gr.

Q.—What other alkaloid is isomeric with Atropine and is quite likely to be found as a contamination in it and its sulphate?

A.—Hyoscyamine.

Q.—Give the official definition for **Hyoscyamine Hydrobromide.**

A.—The hydrobromide of hyoscyamine, an alkaloid obtained from hyoscyamus and other plants of the Solanaceæ. Preserve in well-closed containers, protected from light.

Q.—What is its solubility?

A.—Very soluble in water; 1 Gm. dissolves in 2.5 mils alcohol; 1.7 mils chloroform; 2260 mils ether.

Q.—Is it more or less potent than Atropine?

A.—More.

Q.—What is its dose?

A.—0.0003 Gm., or 1/200 gr.

Q.—What is the synonym for **Scopolamine Hydrobromide?**

A.—Hyoscine hydrobromide.

Q.—Give the official definition.

A.—The hydrobromide of lævorotatory scopolamine, also known as hyoscine, obtained from various plants of the Solanaceæ. Preserve it in well-closed containers protected from light.

Q.—Give its solubility.

A.—1 Gm. dissolves in 1.5 Gm. water; 20 mils alcohol; slightly soluble in chloroform; insoluble in ether.

Q.—What is the dose?

A.—0.0003 Gm., or 1/200 gr.

Q.—What is the antidotal treatment for poisoning by any of these alkaloids?

A.—Empty the stomach promptly; give tannin in some form; give stimulants, whiskey, ammonia or strychnine.

Q.—Give the official definition for **Homatropine Hydrobromide.**

A.—The hydrobromide of homatropine, an alkaloid obtained by the condensation of tropine and mandelic acid. Preserve it in well-closed containers protected from light.

Q.—Give its solubility.

A.—1 Gm. dissolves in 6 mils water; 40 mils alcohol; 420 mils chloroform.

Q.—What is its therapeutic use?

A.—Used to dilate the pupil of the eye.

Q.—What advantage has it over Atropine?

A.—It produces its effects more quickly and they are not so long-continued as atropine.

Q.—What is the dose?

A.—0.0005 Gm., or 1/120 gr.

OTHER OFFICIAL ALKALOIDS AND SALTS

Q.—Give the official definition for **Aconitine.**

A.—An alkaloid obtained from Aconite. Preserve it in well-closed containers, protected from light.

Q.—What peculiar physical property does it have?

A.—A drop of a very dilute solution of it produces a tingling or numbing sensation when placed on the tongue.

Q.—Is it very potent?

A.—Yes, it is said to be the most potent of the official substances.

Q.—What is its dose?

A.—0.00015 Gm., or $\frac{1}{400}$ gr. This is the smallest dose given in the pharmacopœia.

Q.—What precaution is given regarding the tasting of Aconitine?

A.—The alkaloid itself should never be tasted and only very highly diluted solution and then with the greatest caution.

Q.—Give its solubility.

A.—Only slightly soluble in water; 1 Gm. dissolves in 28 mils of alcohol; 65 mils ether; 7 mils benzene.

Q.—What two kinds of Aconitine are found in the market?

A.—Crystalline and amorphous.

Q.—Which kind only should be dispensed?

A.—Only the crystalline.

Q.—What is the particular difference between the two?

A.—The amorphous is said to be principally a mixture of derivative products and has only about $\frac{1}{20}$ the activity of the crystalline.

Q.—Why should the use of Aconitine be discouraged?

A.—It is entirely too active to be administered internally.

Q.—What preparation of it is official?

A.—Oleate of aconitine.

Q.—What is it therapeutically?

A.—Sedative, anodyne, diaphoretic.

Q.—What is the treatment for poisoning by Aconitine?

A.—Place patient in recumbent position and evacuate the stomach, elevate the feet, give stimulants.

Q.—Give the official definition for **Betaeucaine Hydrochloride.**

A.—A synthetic derivative of piperidine, containing when dried to a constant weight at 100° C., not less than 99% of the hydrochloride of, 2, 6, 6-trimethyl-4 benzoyl-oxy-piperidine.

Q.—Give its solubility.

A.—1 Gm. dissolves in 30 mils water; 35 mils alcohol; 6 mils chloroform.

Q.—What is a synonym for it?

A.—Eucaine.

Q.—What is it therapeutically?

A.—Local anesthetic.

Q.—Is it related to Cocaine?

A.—No.

Q.—What advantage does it have over Cocaine?

A.—Its solutions may be heated to boiling for the purpose of sterilization without decomposing them; it does not form a habit.

Q.—Is it given internally?

A.—No.

Q.—Give the official definition for **Caffeina.**

A.—A feebly basic substance obtained from the leaves of Thea sinensis or from the seeds of Coffea arabica, also occurring in some other plants; or prepared synthetically.

Q.—How does it differ from alkaloids?

A.—It is not precipitated by potassio-mercuric iodide (Mayer's reagent).

Q.—Give its solubility.

A.—1 Gm. dissolves in 46 mils of water; 66 mils alcohol; 5.5 mils of chloroform.

Q.—From what source is it usually obtained commercially?

A.—From tea dust or sweepings.

Q.—What is it therapeutically?

A.—Stimulant and diuretic.

Q.—What is the dose?

A.—0.15 Gm. or 2½ gr.

Q.—May Caffeina Citrata be said to be a salt of Caffeine?
A.—No, it is not looked upon as being a salt but rather a mixture of Caffeine and Citric Acid.

Q.—How is it prepared?
A.—By dissolving the citric acid in hot distilled water, then dissolving in this solution an equal weight of caffeine. This mixture is then evaporated to dryness on the water-bath.

Q.—Is this frequently prescribed?
A.—No, used principally for making the Effervescent salt.

Q.—Give the official definition for **Caffeinæ Sodio-Benzoas.**
A.—A mixture of caffeine and sodium benzoate. It contains when dried to constant weight at 80° C., not less than 46% nor more than 50% of anhydrous caffeine, the remainder being sodium benzoate. Preserve in well-closed containers.

Q.—What is the principal reason for this being official?
A.—To furnish a soluble caffeine mixture for hypodermic administration.

Q.—What is its solubility?
A.—1 Gm. dissolves in 1.1 mil water; some caffeine separating on standing; 30 mils alcohol.

Q.—What is the dose?
A.—By mouth, 0.3 Gm., or 5 gr. Hypodermic, 0.2 Gm., or 3 gr.

Q.—How is **Caffeinæ Sodio-Salicylas** prepared?
A.—Equal weights of Caffeine and Sodium Salicylate are triturated with sufficient alcohol to make a smooth paste. This is dried by exposure to air in a moderately warm place.

Q.—What is the dose?
A.—0.2 Gm., or 3 gr.

Q.—Give the official definition for **Cocaina.**
A.—An alkaloid obtained from Erythroxylon Coca and its varieties. Preserve in well-closed containers, protected from light.

Q.—What is its solubility?
A.—1 Gm. will dissolve in 600 mils water; 6.5 mils alcohol; 0.7 mil chloroform; 3.5 mils ether; 12 mils olive oil.

Q.—Is it made synthetically?
A.—Yes, from ecgonine.

Q.—What is it therapeutically?
A.—Local anesthetic.

Q.—What is the dose?
A.—0.015 Gm., or ¼ gr.

Q.—Is the free alkaloid commonly used?
A.—No, because of its sparing solubility, one of the salts is usually preferred.

Q.—What salt is official?
A.—The hydrochloride.

Q.—Give its solubility.
A.—1 Gm. dissolves in 0.4 mil water; 3.2 mils alcohol; 12.5 chloroform.

Q.—What will happen if silver nitrate is dispensed with a solution of cocaine hydrochloride?
A.—Silver chloride will be precipitated.

Q.—What will happen if the alkaloid cocaine is dispensed with a solution of silver nitrate?
A.—The cocaine will combine with the nitrate and precipitate the silver as silver oxide.

Q.—What cocaine salt must be used with a solution of silver nitrate?
A.—The nitrate.

Q.—How is cocaine generally used?
A.—Generally in a 4% solution, the same being injected hypodermically or well rubbed on the part to be anesthetized.

Q.—What legal restrictions are placed on the sale of cocaine, its salts and derivatives?
A.—It can only be dispensed on the prescription of a licensed physician, dentist or veterinarian who is registered with the Internal Revenue Collector of the district. These prescriptions can not be refilled.

Q.—What are the further requirements on this and other prescriptions for narcotics?
A.—The prescription must be dated, have the complete legal signature of the prescriber, not merely his surname, his registry number, must have the patient's name.

Q.—Give the official definition for **Colchicina.**

A.—An alkaloid obtained from Colchicum. Preserve in well-closed containers, protected from light.

Q.—Is it crystalline or amorphous?

A.—Amorphous.

Q.—What effect does light have on it?

A.—Turns it darker.

Q.—What does the U. S. P. direct about tasting it?

A.—It must be tasted with the greatest caution and only when in a highly diluted solution.

Q.—Is it considered a particularly active alkaloid?

A.—Yes, and when an overdose has been in the stomach long enough to exert its inflammatory effects, there is no known antidote.

Q.—What is its solubility?

A.—1 Gm. dissolves in 22 mils water; 220 mils ether; freely soluble in alcohol and chloroform.

Q.—How does its water-solubility compare with other alkaloids?

A.—It is the most soluble of all the alkaloids.

Q.—Are there any official salts?

A.—No, but some are met in practice.

Q.—Which is the most common?

A.—The salicylate.

Q.—What is Colchisal?

A.—A solution of colchicine in methyl salicylate, sold in gelatin capsules, containing 0.00025 Gm. of the alkaloid and 0.2 Gm. of methyl salicylate.

Q.—What is Colchicine therapeutically?

A.—Antirheumatic and alterative, particularly in gout.

Q.—What is the dose?

A.—0.0005 Gm., or $\frac{1}{120}$ gr.

Q.—Give the official definition for **Emetinæ Hydrochloridum.**

A.—The hydrochloride of the alkaloid emetine obtained from ipecac. It contains variable amounts of water of crystallization. Preserve in dark amber-colored vials protected from light.

Q.—What is its solubility?
A.—It is freely soluble in water and alcohol.

Q.—What is it therapeutically?
A.—Expectorant and emetic.

Q.—What especial use is made of it?
A.—Used extensively in the treatment of amebic dysentery and pyorrhea.

Q.—What is the dose?
A.—Hypodermic 0.02 Gm., or 1/3 gr.

Q.—Give the official definition for **Hydrastina.**
A.—An alkaloid obtained from hydrastis or prepared synthetically. Preserve in well-closed containers protected from light.

Q.—What is its solubility?
A.—Almost insoluble in water; 1 Gm. dissolves in 170 mils of alcohol; 1.4 mils chloroform.

Q.—What is the color of hydrastine?
A.—Light yellow or yellowish white.

Q.—What other alkaloid is obtained from Hydrastis?
A.—Berberine.

Q.—What color is it?
A.—Yellow.

Q.—By what other name is Hydrastine frequently called?
A.—The white alkaloid of hydrastis.

Q.—What is the alkaloid therapeutically?
A.—Astringent, alterative, uterine hemostatic.

Q.—What is the dose?
A.—0.01 Gm., or 1/6 gr.

Q.—What salt of Hydrastine is official?
A.—The hydrochloride.

Q.—Give its solubility.
A.—Very soluble in water and alcohol; slightly soluble in chloroform; very slightly soluble in ether.

Q.—How is **Hydrastinine** made?
A.—By oxidizing hydrastine with nitric acid.

Q.—Give the definition for its official salt.
A.—The hydrochloride of hydrastinine, an alkaloid obtained by the oxidation of hydrastine.

Q.—What test is used to distinguish it from hydrastine?
A.—Bromine T. S. added to a solution of hydrastinine hydrochloride produces a yellow precipitate which is completely soluble in ammonia water, leaving an almost colorless solution.

Q.—What is it therapeutically?
A.—Uterine hæmostatic, oxytocic.

Q.—What is the dose?
A.—0.03 Gm. or ½ gr.

Q.—What is the source of **Pelletierine Tannate?**
A.—It is obtained from pomegranate bark.

Q.—Give the official definition for the alkaloidal salt.
A.—A mixture in varying proportions of the tannates of four alkaloids (punicine, iso-punicine, methyl-punicine, and pseudo-punicine) obtained from pomegranate. Preserve it in small, well-closed containers, protected from light.

Q.—Give the solubility of the salt.
A.—1 Gm. dissolves in 240 mils of water; 16 mils of alcohol; 420 mils of ether.

Q.—What is there peculiar about the free alkaloid, pelletierine?
A.—It is a liquid alkaloid.

Q.—What is pelletierine tannate therapeutically?
A.—A taenifuge.

Q.—What is the dose?
A.—0.25 Gm. or 4 gr.

Q.—How should it be given?
A.—Given on an empty stomach, in capsule or syrup, then in from ½ to 2 hours a purge is administered.

Q.—Is it well adapted for use with children?
A.—It is said **not** to be the best remedy in the case of young children.

Q.—What untoward effects may attend its administration?
A.—General muscular relaxation, giddiness, confusion, uncertain vision, nausea, vomiting.

Q.—By what other name is **Physostigmine** known?
A.—Eserine.

Q.—What is the source of the alkaloid?
A.—From physostigma, commonly called Calabar Bean.

Q.—Is the free alkaloid official?
A.—No.

Q.—What salt is official?
A.—Physostigmine salicylate.

Q.—What is its synonym?
A.—Eserine salicylate.

Q.—Give the official definition.
A.—The salicylate of an alkaloid obtained from physostigma. Preserve it in well-closed, small containers protected from light.

Q.—What effect does light and air have on this salt?
A.—Causes it to turn red.

Q.—Give its solubility.
A.—1 Gm. dissolves in 75 mils water; 16 mils alcohol; 6 mils chloroform.

Q.—How do solutions of the salt decompose?
A.—They acquire a red color.

Q.—What measures are adopted to prevent this?
A.—Add hypophosphorous acid in the proportion of 1:500.

Q.—What particular advantage does the alkaloid or its salt have over the drug itself?
A.—The drug contains another alkaloid, calabarine which is antagonistic to physostigmine.

Q.—What is it therapeutically?
A.—Sedative, myotic.

Q.—What is the dose?
A.—0.001 Gm. or $\frac{1}{60}$ gr.

Q.—Is it poisonous?
A.—Yes.

Q.—What is the antidotal treatment?
A.—Evacuate the stomach at once. Atropine hypodermically. Stimulants.

Q.—How are these salts best bought?
A.—In hermetically sealed tubes containing 1 gr. each.

Q.—What is the source of **Pilocarpine?**
A.—From pilocarpus.

Q.—What is another name for Pilocarpus?
A.—Jaborandi.

Q.—What part of the plant is official?
A.—The leaflets.

Q.—What are the peculiar characteristics of the alkaloid?
A.—It is a colorless, syrupy liquid.

Q.—Is the free alkaloid official?
A.—No.

Q.—What salts of it are official?
A.—The hydrochloride and the nitrate.

Q.—Which is the more soluble?
A.—The hydrochloride.

Q.—What are the salts therapeutically?
A.—Diaphoretic, sialogogue, myotic.

Q.—What is the dose?
A.—By mouth 0.01 Gm. or $\frac{1}{6}$ gr. Hypodermic 0.005 or $\frac{1}{12}$ gr.

Q.—What external use is made of the alkaloids or tincture of the drug?
A.—They are said to promote the growth of hair, hence are constituents of many hair tonics.

Q.—Is the alkaloid **Sparteine** official?
A.—No.

Q.—What salt of it is official?
A.—The sulphate.

Q.—What is the source of Sparteine?
A.—Obtained from Cytisus Scoparius.

Q.—What is the common name for Cytisus Scoparius?
A.—Broom or Broom Tops.

Q.—What is the peculiar physical characteristic of the free alkaloid?
A.—It is a liquid.

Q.—Is the sulphate also a liquid?
A.—No, it is solid.

Q.—What is its solubility?
A.—1 Gm. is soluble in 1.1 mils water; 3 mils alcohol.

Q.—How does exposure to the air affect it?
A.—It takes up moisture; hygroscopic.

Q.—What is it therapeutically?
A.—Cardiac stimulant and diuretic.

Q.—What is the dose?
A.—0.01 Gm., or 1/6 gr.

Q.—Give the official definition for **Theobromine Sodio-Salicylate.**
A.—Sodium theobromide and sodium salicylate in approximately molecular proportions. It yields when dried to constant weight in a desiccator over sulphuric acid not less than 46.5% of theobromine. Preserve it in well-closed containers.

Q.—Give its solubility.
A.—1 Gm. dissolves in 1 mil water; slightly soluble in alcohol.

Q.—How does exposure to the air affect it?
A.—It gradually absorbs carbon dioxide with the liberation of theobromine, becoming partly insoluble.

Q.—What kind of a substance is it?
A.—A white odorless powder, of a sweetish saline taste, becoming somewhat alkaline.

Q.—What is the "trade" name for it?
A.—Diuretin.

Q.—What is the source of **Theobromine?**
A.—Obtained from the press cake of the seed of Theobroma Cacao.

Q.—What is it therapeutically?
A.—Diuretic.

Q.—What is the dose?
A.—1 Gm., or 15 gr.

Q.—Give the official definition for **Theophyllina.**
A.—An organic base isomeric with Theobromine. It is found in small amounts in the leaves of Thea sinensis and is also prepared synthetically.

Q.—What is the synonym for it?
A.—Dimethylxanthine.

Q.—How does exposure to air affect it?
A.—No effect; permanent in air.

Q.—Give its solubility.
A.—1 Gm. dissolves in 100 mils of water; 80 mils alcohol.

Q.—How is it made synthetically?
A.—By methylating uric acid.

Q.—Give a "trade" name for it.
A.—Theocine.

Q.—What is it therapeutically?
A.—Diuretic.

Q.—What is the dose?
A.—0.25 Gm., or 4 gr.

Q.—Give the official definition for **Veratrina.**
A.—A mixture of alkaloids obtained from the seed of Asagræa officinalis. Preserve in well-closed containers, protected from light.

Q.—What is the common name for the seed?
A.—Cevadilla seed or sabidilla seed.

Q.—Is this alkaloid ever found in Veratrum?
A.—No.

Q.—What are some of its characteristics?
A.—It is a white or grayish-white amorphous powder, odorless but causing an intense irritation and sneezing when even a minute particle reaches the nasal mucous membrane. It has an acrid taste and gives a tingling sensation and a numbness to the tongue.

Q.—What does the U. S. P. say about tasting it?
A.—Great caution must be used in tasting it.

Q.—Give its solubility.
A.—1 Gm. dissolves in 1760 mils water; 2.8 mils alcohol, 0.7 mils chloroform.

Q.—What other alkaloid does it resemble in its action?
A.—Aconitine.

Q.—Is it given internally?

A.—It is not intended to be given internally and the U. S. P. gives no dose for it.

Q.—What is its therapeutic use?

A.—Parasiticide.

U. S. P. ALKALOIDAL DRUGS

Q.—What is meant by "assaying" a drug?

A.—Analyzing a drug to determine the quantity of active principle which it contains.

Q.—What class of active principles is generally contained by drugs which are assayed?

A.—Alkaloids.

Q.—What other kind of assay are some drugs subjected to?

A.—Physiological or biological assay.

Q.—What is this for?

A.—For the purpose of standardizing the therapeutical value of the drug.

Q.—Why is this advisable?

A.—The drugs contain potent constituents, and these constituents will vary in quantity, but the principles are not such that they can be determined by chemical methods; in order, then, that a definite knowledge of their value may be obtained, they are administered to animals which are particularly sensitive to the drug and the drug is standardized by the effect which it has on the animal.

Q.—Is such standardization as reliable as chemical analysis?

A.—No, but in most cases no satisfactory method for chemical assay has been devised.

Q.—What two general methods are used in the chemical assay of drugs?

A.—Gravimetric and volumetric.

Q.—What is meant by Gravimetric analysis?

A.—Separating the desired constituent from the rest of the drug, then weighing it.

Q.—What is meant by Volumetric assay?

A.—Separating the active constituent from the rest of the drug, then determining the quantity by titration.

Q.—Which is the most used in alkaloidal assay?
A.—Volumetric.

Q.—What are the essential features in the assay of a drug?
A.—First, a **definite weight** of the drug is extracted with water, acidulated water, alcohol or the best solvent for the active principle. Second, the purification of the isolated principle (alkaloid) this is accomplished by the use of "immiscible solvents"; the alkaloid is isolated usually in the form of a salt which is water-soluble, to this ammonia water is added, this decomposes the alkaloidal salt and sets the alkaloid free, the free alkaloid now goes into solution in the chloroform which is added with the ammonia water. Next is added diluted sulphuric acid, this has the effect of forming a salt again with the alkaloid which dissolves in the water present. Again ammonia water and chloroform are added and the free alkaloid is formed and dissolved in chloroform. Third, now having the alkaloid in solution in chloroform, the chloroform may be volatilized and the alkaloid weighed, or the alkaloid may be dissolved in a measured volume of N/10 sulphuric acid V. S. and the excess of acid be determined with N/50 KOH V. S. Now multiply the number of mils of the acid used by the mil equivalent of the alkaloid as shown in the U. S. P. and this will give the weight of alkaloid which was contained in the weight of drug first taken, then calculate the percentage of alkaloid in the usual way.

Q.—What indicators are used to show neutralization in these titrations?
A.—Different ones are directed with different alkaloids, but they include, cochineal T.S., iodeosin T.S., methyl red T.S. and hematoxylin T.S.

Q.—Why is N/50 KOH used to titrate the excess of acid when N/10 H_2SO_4 was first used?
A.—This enables the operator to approach the end point more carefully and make a more accurate determination.

Q.—How may one tell when the drug is completely exhausted?
A.—By adding to the last portion of the extracted liquid a drop of one of the "alkaloidal precipitants" as Mayer's solution and if any alkaloid remains, a precipitate or cloudiness will show, showing necessity for further extraction.

Q.—What is the alkaloidal requirement of **Aconite?**

A.—It must contain not less than 0.5% of ether-soluble alkaloids.

Q.—What is the principal alkaloid of Aconite?

A.—Aconitine.

Q.—What are the synonyms for Aconite?

A.—Monkshood, Aconite Root.

Q.—What preparations of Aconite are official?

A.—Fluidextract, extract and tincture.

Q.—How is Aconite assayed?

A.—Volumetrically.

Q.—What alternative method is permitted?

A.—It may be assayed biologically.

Q.—How much alkaloid is each mil of N/10 H_2SO_4 consumed equal to?

A.—64.539 milligrams.

Q.—What are the official **Mydriatic Drugs?**

A.—Belladonna leaf and root, Hyoscyamus and Stramonium.

Q.—How are they assayed?

A.—All are assayed volumetrically.

Q.—What is the alkaloidal requirement for **Belladonnæ Folia?**

A.—Must yield not less than 0.3% of total alkaloids of Belladonna Leaves.

Q.—What is the principal alkaloid?

A.—Atropine.

Q.—What other alkaloids does it contain?

A.—Hyoscyamine, belladonnine, oxyatropine, atropamine.

Q.—What preparations of Belladonna Leaves are official?

A.—Extract, tincture, plaster.

Q.—What acid holds the alkaloids in combination in the leaves?

A.—Malic acid.

Q.—What is the synonym for Belladonna?

A.—Deadly nightshade.

Q.—What are the alkaloidal requirements of **Belladonnæ Radix?**

A.—Must contain not less than 0.45% of the total alkaloids of Belladonna Root.

Q.—What preparation of Belladonna Root is official?

A.—Fluidextract.

Q.—What is the mil equivalent for the alkaloids of Belladonna?

A.—28.92 milligrams.

Q.—What are the alkaloidal requirements of **Hyoscyamus?**

A.—Must yield not less than 0.065% alkaloids of Hyoscyamus.

Q.—What is the principal alkaloid of Hyoscyamus?

A.—Hyoscyamine.

Q.—What other alkaloids does it contain?

A.—Hyoscine, scopolamine, hyoscipicrin (the latter is a glucoside).

Q.—What is the synonym for Hyoscyamus?

A.—Henbane.

Q.—What preparations of Hyoscyamus are official?

A.—Extract, fluidextract, tincture.

Q.—What are the alkaloidal requirements of **Stramonium?**

A.—Must yield not less than 0.25% total alkaloids of Stramonium.

Q.—What is the official part of the plant?

A.—The leaves.

Q.—Give the synonyms for Stramonium.

A.—Jamestown Weed. Jimson Weed.

Q.—What is the alkaloid of Stramonium?

A.—Daturine.

Q.—What is said to be the composition of Daturine?

A.—Hyoscyamine and atropine held in combination with malic (daturic) acid.

Q.—What preparations of Stramonium are official?

A.—Extract (2), tincture (U. S. P.); fluidextract (N. F.).

Q.—What are the alkaloidal requirements of Cinchona?

A.—It must contain not less than 5% of alkaloids of Cinchona.

Q.—What are the common names for **Cinchona?**
A.—Yellow cinchona. Calisaya bark. Yellow Peruvian bark.

Q.—How is Cinchona assayed?
A.—Gravimetrically, the alkaloids are extracted from a weighed quantity of cinchona, then dried and weighed.

Q.—What is the reason for assaying Cinchona gravimetrically?
A.—Because it contains so many alkaloids.

Q.—What preparations are official?
A.—Fluidextract and tincture.

Q.—What are the alkaloidal requirements for **Cinchona Rubra?**
A.—It must yield not less than 5% of the alkaloids of Red Cinchona.

Q.—What particular constituent is found to a much greater extent in Red Cinchona than in Cinchona?
A.—Cinchona red.

Q.—Is Red Cinchona assayed in a manner different from Cinchona?
A.—No, assayed in the same way.

Q.—What is the synonym for Cinchona Rubra?
A.—Red Peruvian bark.

Q.—What preparations of it are official?
A.—Compound tincture, and aqueous fluidextract.

Q.—What are the alkaloidal requirements for **Colchici Cormus?**
A.—It must yield not less than 0.35% of colchicine.

Q.—In the assay of Colchicum why is neither alkali nor acid used in extracting the alkaloid?
A.—Because either a strong alkali or acid will decompose the alkaloid.

Q.—What is used to extract the drug?
A.—Only water, as the alkaloid colchicine is soluble in 22 parts of water.

Q.—Why then is solution of lead subacetate added to the mixture?
A.—It forms insoluble compounds with the tannin and resinous matter which precipitates, leaving the alkaloid in watery solution.

Q.—Why is sodium phosphate added?
A.—This removes the excess of lead.

Q.—Why is the alkaloidal extract dissolved in N/20 H_2SO_4 V.S. instead of N/10 as is usually the case?
A.—The weaker the acid is the less chance there is of decomposing the alkaloid with the formation of colored decomposition products.

Q.—What preparations of Colchicum Corm are official?
A.—Extract. Fluidextract (N. F.)

Q.—What are the alkaloidal requirements of **Colchici Semen?**
A.—They must yield not less than 0.45% of colchicine.

Q.—What preparations of the Seed are official?
A.—Fluidextract and tincture.

Q.—What are the alkaloidal requirements of **Guarana?**
A.—It must yield not less than 4% of caffeine.

Q.—How is Guarana assayed?
A.—Gravimetrically.

Q.—Why is it assayed gravimetrically?
A.—Because the caffeine does not form stable salts with acids.

Q.—Why does U. S. P. direct the use of Iodine T. S. in place of potassium mercuric iodide T. S. in testing for complete extraction of the drug?
A.—Because mercuric potassium T. S. will not precipitate caffeine.

Q.—What preparation of Guarana is official?
A.—Fluidextract.

Q.—What are the alkaloidal requirements of **Hydrastis?**
A.—It must yield not less than 2.5% of ether-soluble alkaloids of Hydrastis.

Q.—What alkaloids does it contain?
A.—Hydrastine and berberine, canadine.

Q.—What synonyms are applied to the two principal alkaloids?
A.—Hydrastine is called the "white alkaloid of hydrastis", and berberine the "yellow alkaloid of hydrastis".

Q.—How is Hydrastis assayed?
A.—Gravimetrically.

Q.—What preparations of Hydrastis are official?
A.—Extract, fluidextract, glycerite and tincture.

Q.—What are the alkaloidal requirements of Ipecacuanha?
A.—It must yield not less than 1.75% of ether-soluble alkaloids of Ipecac.

Q.—How is it assayed?
A.—Volumetrically.

Q.—What alkaloids are present in **Ipecacuanha?**
A.—Emetine, cephaëline, psychotrine.

Q.—Which is the least soluble in ether?
A.—Psychotrine.

Q.—Which alkaloid is the most decided emetic?
A.—Cephaëline.

Q.—What liquid preparation is official?
A.—Fluidextract.

Q.—What are the alkaloidal requirements of **Nux Vomica?**
A.—It must yield not less than 2.5% of the alkaloids of Nux Vomica.

Q.—How is it assayed?
A.—Volumetrically.

Q.—What alkaloids does it contain?
A.—Strychnine and brucine and loganine.

Q.—What acid does it contain?
A.—Igasuric acid.

Q.—What troublesome constituent does Nux Vomica contain?
A.—A fixed oil.

Q.—What is the mil equivalent of alkaloids for the N/10 H_2SO_4 V.S.?
A.—Each mil consumed is equal to 36.4 milligrams of alkaloids.

Q.—What are the alkaloidal requirements of Opium?
A.—It must yield not less than 9.5% of anhydrous morphine.

Q.—What are the requirements of **Powdered Opium, Deodorized Opium and Granulated Opium?**

A.—Each must yield not less than 10% nor more than 10.5% of anhydrous morphine.

Q.—How is Opium assayed?

A.—Volumetrically.

Q.—How many alkaloids does it contain?

A.—About 19.

Q.—It is customary to assay drugs gravimetrically when they contain more than one alkaloid, why is this an exception?

A.—Because the value is based on one alkaloid only.

Q.—Why is no alkali, acid or alcohol used in extracting Opium for assay?

A.—The morphine is present as morphine sulphate or as morphine meconate, both of which are soluble in water.

Q.—Why is lime used in the assay?

A.—It quite readily dissolves the morphine and leaves some undesirable principles which are more readily removed.

Q.—What is the particular use of ether in the assay of Opium?

A.—All the alkaloids of Opium except Morphine are soluble in ether, hence these are kept in solution while morphine precipitates out.

Q.—What are the alkaloidal requirements of **Physostigma?**

A.—It must yield not less than 0.15% of the alkaloids of Physostigma.

Q.—What part of the plant is official?

A.—The seeds.

Q.—What are the synonyms for Physostigma?

A.—Calabar bean. Ordeal bean.

Q.—What alkaloids does it contain?

A.—Physostigmine (eserine) eseridine, physovenine.

Q.—What preparations are official?

A.—Extract and tincture.

Q.—How is it assayed?

A.—Volumetrically.

Q.—Why is sodium bicarbonate used in the assay?
A.—Because it is a mild alkali. Strong alkalies or acids decompose the alkaloids.

Q.—What is the synonym for **Pilocarpus?**
A.—Jaborandi.

Q.—What part of the plant is official?
A.—The leaflets.

Q.—What are the alkaloidal requirements of Pilocarpus?
A.—Must yield not less than 0.6% of alkaloids.

Q.—How is it assayed?
A.—Volumetrically.

Q.—What alkaloids does it contain?
A.—Pilocarpine, isopilocarpine, pilocarpidine, carpilline.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is **Aspidospermata?**
A.—The bark.

Q.—What is the synonym?
A.—Quebracho.

Q.—What alkaloids does it contain?
A.—Aspidospermine, aspidospermatine, quebrachine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Gelsemium?**
A.—The rhizome and roots.

Q.—What are the synonyms?
A.—Yellow Jasmine Root. Yellow Jessamine.

Q.—What alkaloids does it contain?
A.—Gelsemine, gelseminine, sempervirine.

Q.—What is the English name for Granatum?
A.—Pomegranate.

Q.—What part of the plant is official?
A.—The bark of the stem and roots.

Q.—What alkaloids does it contain?
A.—Pelletierine, isopelletierine, methylpelletierine, pseudopelletierine.

Q.—What part of the plant is official as **Lobelia?**
A.—The leaves and flowering tops.

Q.—What is the synonym?
A.—Indian tobacco.

Q.—What alkaloid does it contain?
A.—Lobeline.

Q.—What is there peculiar about this alkaloid?
A.—It is a liquid.

Q.—What preparations are official?
A.—Fluidextract and tincture.

Q.—What part of the plant is official as **Sanguinaria?**
A.—The rhizome and roots.

Q.—What is the synonym?
A.—Blood Root.

Q.—What alkaloids does it contain?
A.—Sanguinarine, chelerythrine, protopine, berberine.

Q.—What preparations are official?
A.—Tincture and fluidextract.

Q.—What part of the plant is official as **Spigelia?**
A.—The rhizome and roots.

Q.—What is the synonym?
A.—Pinkroot.

Q.—What alkaloid does it contain?
A.—Spigeline.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Staphisagria?**
A.—The seeds.

Q.—What is the synonym?
A.—Stavesacre.

Q.—What alkaloids does it contain?
A.—Delphinine, delphinoidine, delphisine, staphisagrine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Veratrum Viride?**
A.—The rhizome and roots.

Q.—What is the synonym?
A.—Green Hellebore. American Hellebore.

Q.—What alkaloids does it contain?
A.—Jervine, pseudojervine, rubijervine; veratroidine, cevadine.

Q.—What preparations are official?
A.—Fluidextract and tincture.

ALKALOIDAL DRUGS OF THE N. F.

Q.—How many drugs of the N. F. are assayed?
A.—Four.

Q.—Name them.
A.—Coffee Tosta, Ignatia, Conium, and Kola.

Q.—What is the active constituent of **Coffea Tosta?**
A.—Caffeine.

Q.—How much must it yield?
A.—Not less than 1%.

Q.—What is the synonym for Coffea Tosta?
A.—Roasted Coffee.

Q.—What part of **Conium maculatum** is official?
A.—The fruit.

Q.—How soon after collecting must it be used?
A.—Within two years.

Q.—What are its alkaloidal requirements?
A.—It must yield not less than 0.5% of coniine.

Q.—What is there peculiar about **Coniine?**
A.—It is a liquid alkaloid.

Q.—What preparation of Conium is official?
A.—Fluidextract.

Q.—To what U. S. P. drug is **Ignatia** related?
A.—Nux Vomica.

Q.—What part of the plant is official?
A.—The seeds.

Q.—What are the synonyms?
A.—Saint Ignatius Bean. Ignatia Amara.

Q.—What are the alkaloidal requirements of Ignatia?
A.—It must yield not less than 2% of alkaloids of Ignatia.

Q.—What alkaloids does it contain?
A.—Strychnine and brucine.

Q.—How is it assayed?
A.—Volumetrically.

Q.—What preparation is official?
A.—Tincture.

Q.—What part of the plant is official as **Berberis?**
A.—The rhizome and roots.

Q.—What is the synonym?
A.—Oregon Grape Root.

Q.—What alkaloids does it contain?
A.—Berberine, oxyacanthine, berberamine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is **Corydalis?**
A.—The tubers.

Q.—What are the synonyms?
A.—Turkey Corn. Squirrel Corn.

Q.—What alkaloid does it contain?
A.—Corydaline.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is the official **Delphinium?**
A.—The seeds.

Q.—What is the English name?
A.—Larkspur Seed.

Q.—What alkaloids does it contain?
A.—Delphinine, delphinoidine

Q.—What preparation is official?
A.—Tincture.

Q.—What part of the plant is the official **Helonias?**
A.—The rhizome and roots.

Q.—What is the synonym?
A.—False Unicorn.

Q.—What alkaloid is present?
A.—Veratrine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Cactus Grandiflorus?**
A.—The fresh stems.

Q.—How is it usually found in commerce?
A.—Preserved in alcohol.

Q.—What is the synonym?
A.—Night Blooming Cereus.

Q.—What alkaloid does it contain?
A.—Cactine.

Q.—What preparation is official?
A.—Tincture, 50%.

Q.—What part of the plant is the official **Caulophyllum?**
A.—The rhizome and roots.

Q.—What are the synonyms?
A.—Blue Cohosh. Papoose Root. Squaw Root.

Q.—What alkaloid does it contain?
A.—Caulophylline.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Cocillana?**
A.—The bark.

Q.—What alkaloid does it contain?
A.—Rusbyine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is **Condurango?**
A.—The bark.

Q.—Does it contain an alkaloid?
A.—Yes, its action is much like strychnine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Coptis?**
A.—The whole plant.

Q.—What is the synonym?
A.—Goldthread.

Q.—What alkaloids does it contain?
A.—Berberine, coptine.

Q.—What other alkaloid does Coptine resemble?
A.—Hydrastine.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is the official **Kola?**
A.—The cotyledons.

Q.—What alkaloid does it contain?
A.—Caffeine.

Q.—How much must it contain?
A.—Not less than 1.5%.

Q.—How is it assayed?
A.—Gravimetrically.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What is the English name for **Papaveris Fructus?**
A.—Poppy Capsules.

Q.—What alkaloid do they contain?
A.—Morphine.

Q.—What preparation is official?
A.—Syrup.

Q.—What part of the plant is official as **Pareira?**
A.—The roots.

Q.—What alkaloid does it contain?
A.—Pelosine, (identical with berberbine).

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of the plant is official as **Passiflora?**
A.—The dried herbage of Passiflora incarnata.

Q.—What is the English name for Passiflora?
A.—Passion Flower.

Q.—What is the synonym?
A.—Passion vine.

Q.—What preparation is official?
A.—Tincture, 20%.

Q.—What part of **Cytisus** scoparius is official?
A.—The tops.

Q.—What is the official title?
A.—Scoparius.

Q.—What is the synonym?
A.—Broom Tops.

Q.—What alkaloid does it contain?
A.—**Sparteine.**

Q.—What is there peculiar about this alkaloid?
A.—It is a liquid.

Q.—What preparation is official?
A.—Fluidextract.

Q.—What part of **Solanum** carolinense is official?
A.—The fruit.

Q.—What is the official title?
A.—Solanum.

Q.—What is the synonym?
A.—Horse-nettle Berries.

Q.—What alkaloid do they contain?
A.—Solanine.

Q.—What preparation is official?
A.—Fuidextract.

Q.—What part of **Verbena** hastata is official?
A.—The overground portion.

Q.—What is the official title?
A.—Verbena.

Q.—What is the synonym?
A.—Blue Vervain.

Q.—Does it contain an alkaloid?
A.—Yes, a volatile alkaloid to which no name has been assigned.

Q.—What preparation is official?
A.—Fluidextract.

THE PRESCRIPTION

Q.—What is the prescription?
A.—It is a written order from a physician to a pharmacist directing the preparation and dispensing of medicine.

Q.—From what is the word "prescription" derived?
A.—From the Latin words "præ" meaning "before" and "scribere" meaning "to write," hence literally, to write before.

Q.—What language is generally used in writing prescriptions?
A.—Latin.

Q.—Why is Latin used?
A.—It is the language of science. It is a dead language hence not subject to change from time to time as one which is in constant use. Being the language of science it is universally understood and the prescription written in Latin may be read, understood and correctly compounded by the educated pharmacist no matter in what country the prescription originated and no matter where it is offered for compounding.

Q.—Is this foregoing answer absolutely true?
A.—No, not absolutely.

Q.—What objections may be raised to it?
A.—Notwithstanding that Latin is a dead language, it is not absolutely alike in all countries, for each country will modify it a little to conform to the language of that particular country, hence we find so-called French Latin, German Latin, etc.

Q.—Are all American prescriptions written in good Latin?

A.—No, it is a well-established fact that the average physician is not well versed in Latin, hence does not write a good Latin prescription.

Q.—What is the result of these conditions?

A.—Some of the foremost teachers in medical colleges advocate the writing of prescriptions in pure and simple English.

Q.—What good objection may be raised to this?

A.—Written in English the patient may at all times know exactly what is prescribed for him and this is not always desirable.

Q.—Are all prescriptions written in one system of weights and measures?

A.—No, some are written in apothecaries' and some in the metric system.

Q.—Name the parts into which a prescription may be divided for study.

A.—(1) date; (2) name of patient; (3) superscription; (4) inscription; (5) subscription; (6) signa; (7) name of the physician.

Q.—Why is the date necessary?

A.—It helps to identify the prescription and if the prescription contains a narcotic, it must be dated to comply with the law.

Q.—Why is the name of the patient desirable?

A.—This further helps to identify the prescription and is required by law for narcotics. Knowing that the prescription is for an adult or a child will influence the pharmacist in determining the correctness of the doses.

Q.—Why need the pharmacist concern himself with dosage in a prescription written by a regularly licensed physician?

A.—He is morally responsible and must see to it that the patient gets what is for his best good. If he dispenses a poisonous overdose which has been inadvertently written by the physician, he is legally responsible with the physician for such error. This is the best argument against dispensing by physicians for passing through other hands an overdose is more likely to be detected.

Q.—What is the **superscription**?

A.—The character like ℞.

Q.—What does this really amount to?
A.—It is translated "take thou of."

Q.—What is the origin of this sign?
A.—It is said to be the legacy of ancient times, when it was customary for the physician to place the sign of Jupiter on the prescription as an invocation to that deity, for his intercession for the patient.

Q.—What is the **Inscription?**
A.—This is the prescription proper, the medicinal substances and the quantities.

Q.—What should be the terminations of the words used in the inscription?
A.—They are always in the Genitive case, because of the translation of the Superscription, "take thou of."

Q.—Are the full words always written in the inscription?
A.—No, generally not.

Q.—What care should be observed in writing abbreviations?
A.—To see that they are complete enough so as not to be mistaken for some other word than is intended.

Q.—What is the objection to the abbreviation "sulph"?
A.—It might mean, sulphur, sulphate, sulphite or sulphide.

Q.—What is the objection to Hyd. Chlor.?
A.—It might mean, hydrated chloral, mercuric chloride or mercurous chloride.

Q.—What guide should be used in writing abbreviations?
A.—The U. S. P. and N. F., there are official abbreviations for all substances official in either book.

Q.—What systems of weights and measures are used by physicians in writing prescriptions?.
A.—Apothecaries' and metric systems.

Q.—Is it quite the right thing for the pharmacist to have only one set of weights and measures, then convert from one system to the other for such prescriptions?
A.—No, for no matter how expert he may be, there is always a chance for error in making conversions which would not occur if the exact weights were used directly.

Q.—Into what parts may the Inscription be divided?
A.—The Basis, the Adjuvant, the Corrective and the Vehicle.

Q.—What is the **Basis** of the Inscription?

A.—It is that particular drug upon which the physician depends particularly to effect a cure.

Q.—What is the **Adjuvant?**

A.—It is the drug which is added to help the action of the Basis.

Q.—What is the **Corrective?**

A.—It is the substance which is added to disguise an unpleasant taste or a disagreeable odor or to otherwise render the medicine more palatable.

Q.—What is the **Vehicle?**

A.—It is the solvent or diluent which carries the other ingredients and allows the adjustment of doses.

Q.—Is it common practice at this time to have all of these parts in the Inscription?

A.—No, the tendency now is to prescribe a single substance or a single chemical substance with a solvent.

Q.—Are prescriptions for ointments designated by the same terms?

A.—No, not generally, but they should be.

Q.—What is the particular difference?

A.—Usually in ointments the vehicle is called the base.

Q.—Should this be so?

A.—The Base of an ointment should be the principal ingredient, just the same as it is in a liquid mixture, therefore, the lard, petrolatum or lanolin should be referred to as the Vehicle, not the Base.

Q.—What is the **Subscription?**

A.—The directions from the physician to the pharmacist as to method of dispensing.

Q.—Give an example of a Subscription.

A.—Fiat Mistura (make a mixture) or Fiat massa et in pilulas No. X divide (make a mass and divide into ten pills).

Q.—Are these directions generally written in full?

A.—No, they are generally abbreviated.

Q.—How is "make a mixture" frequently abbreviated?

A.—M. (this, however, may also be said to be the abbreviation for Misce, meaning simply, mix).

Q.—How is "make a mass and divide into ten pills" usually abbreviated?

A.—"Ft. pil. No. X."

Q.—What is **Signa?**

A.—The directions to the patient telling how the medicine should be taken.

Q.—Are these directions written in Latin or English?

A.—Frequently in Latin.

Q.—Should the label on the prescription package have these directions in Latin also?

A.—No, it should be the language understood by the patient and the writing should be particularly plain, preferably typewritten.

Q.—Is it important that the physician's name be signed to the prescription?

A.—Yes, it serves to identify the prescription, it may make it possible for the pharmacist to consult the physician in case an error in dosage is found or if there is some serious incompatibility in the prescription.

Q.—Do physicians always write legible prescriptions?

A.—No.

Q.—What is to be done if the pharmacist receives a prescription which he can not decipher, is he right in guessing what the prescriber wants?

A.—No, he should never guess, he must be certain, therefore, he must consult the physician either by telephone or in person.

Q.—Does the physician always take such consultation in good part?

A.—No, not always, but this must never lead the pharmacist to do otherwise for he must always have the safeguarding of the patient in mind.

Q.—To whom does the prescription belong?

A.—This question has been discussed far and wide and at great length, with different conclusions at different places. It is generally said the prescription is really the property of the physician, as it comes as a result of his labor and study, that he does not sell the prescription to the patient, but writes what the patient is to get from the pharmacist because the patient is not versed in medicine and pharmacy, hence could not be expected to tell the

pharmacist what the physician had ordered. The prescription is simply a written order to the pharmacist in place of a verbal one. No one will contend that should the physician telephone the order to the pharmacist, that the telephone would become the property of the patient, however, the telephone has here served the purpose of the written prescription.

Q.—What may be said about the custody of the prescription?

A.—In the State of Illinois the law requires that the pharmacist keep on file for five years the original of each prescription filled. In all states all prescriptions containing narcotics must be kept on file according to the provisions of the Harrison Law.

Q.—Should prescriptions be refilled by the pharmacist?

A.—This is a question which every pharmacist must settle for himself unless the prescription bears the words "non repetetur" (not to be repeated).

Q.—What is a good rule to follow in the refilling of prescriptions?

A.—There is scarcely ever a physician who objects to the refilling of harmless prescriptions for coughs or of liniments but no prescriptions for potent drugs should be refilled without the advice of the physician. In such prescriptions should be included the salicylates, Fowler's solution and the like.

Q.—What care must the pharmacist take when receiving a prescription?

A.—Get the patient's name if it is not already on the prescription. If there is a potent drug ordered, be sure there is no error in dosage.

Q.—What is the meaning of the following terms?

ABBREVIATION	WORDS	ENGLISH TRANSLATION
q. s.	quantum satis	a sufficient quantity
ad	ad	to
aa	ana	of each
adde	adde	add
t.i.d.	ter in die	three times a day
a.c.	ante cibum	before meals
p.c.	post cibum	after meals
c.p.	cochleare parvum	a teaspoonful
D.T.D.	dentur tales doses	let there be given of such doses
mitte	mitte	send
cap.	capiat	let the patient take
chartula	chartula	small paper (powder)

ABBREVIATION	WORDS	ENGLISH TRANSLA'
coch.mag.	cochleare magnum	tablespoonful
collyr	collyrium	eye wash
ft.	fiat	let it be made
gtt.	guttæ	drops
hora	hora	an hour
h.s.	hori somni	at bed time
M.	misce	mix
om.hor.	omni horae	every hour
om.man.	omni mane	every morning
om.noct.	omni nocte	every night
opt.	optimus	the best
P.aeq.	partes aequalis	equal parts
pil.	pilula	pills
P.r.n.	pro re nata	when needed
quotidie	quotidie	daily
S.A.	secundum artem	according to art
sesqui	sesqui	once and a half
Sig.	Signatur	let it be marked
S.V.T.	spiritus vini tenius	diluted alcohol
tabella	tabella	a lozenge (tablet)
tere bene	tere bene	rub well
tere sim.	tere simul	rub together
ut.dict.	ut dictum	as directed

INCOMPATIBILITY

Q.—What does the word "**incompatible**" mean?
A.—Lack of agreement.

Q.—What does it mean in connection with the compounding of a prescription?
A.—Some untoward reaction which was not wanted or expected.

Q.—Into what **three classes are incompatibilities** commonly divided?
A.—Chemical, physical or pharmaceutical and therapeutical.

Q.—What do most incompatibilities really amount to?
A.—The relative solubility of the product of reaction.

Q.—Are all "so-called" incompatibilities really incompatibilities?
A.—No, for many times the physician when writing a prescription really expects to have a precipitate form.

Q.—Give an example of such a prescription.

A.—℞.

Zinci Sulphatis	2. Gm.
Plumbi Acetatis	3. Gm.
Aquæ	100. mils.
M.	

Q.—What will happen when this is compounded?

A.—A fine white precipitate of lead sulphate will form.

Q.—Should this be filtered out?

A.—No, the physician wants this to form.

Q.—What will happen when Ammonium Carbonate is mixed with Syrup of Squill?

A.—The Ammonium Carbonate will be decomposed and there will be an evolution of carbon dioxide.

Q.—Is this an incompatibility?

A.—No, for the pharmacist knows there is acetic acid in the syrup, and that all carbonates are decomposed by acids with the evolution of carbon dioxide, hence this is expected.

Q.—What precaution will the compounder take with a prescription of this kind?

A.—He will put the two substances together in a container of ample proportions so there will be no loss of liquid by overflowing, then take care not to put the liquid in the bottle until the reaction is complete.

Q.—Point out another similar condition which may unexpectedly occur.

A.—In case syrup of acacia is prescribed with a carbonate or bicarbonate. If the syrup of acacia has been made for some time and has started to ferment, there will probably be sufficient acid present to decompose the salt.

Q.—Name another example of chemical incompatibility.

A.—Formation of insoluble organic salt, as the presence of a soluble quinine salt, as quinine bisulphate with an acetate, as potassium acetate, these will react to form quinine acetate which is one of the most insoluble quinine salts.

Q.—What effect would syrup of citric acid have on a solution of sodium salicylate?

A.—The citric acid would displace the salicylate from its sodium combination, forming salicylic acid which is not easily water soluble and this would precipitate.

Q.—Name another form of chemical incompatibility.

A.—The decomposition of hydrated chloral by an alkali, the resulting products being chloroform and a formate of the alkali used. Also alcohol will decompose chloral into chloral alcoholate, this is lighter than water and where such decomposition takes place is likely to be found floating on the surface of the mixture where most of it would be taken at the first dose.

Q.—What two classes of salts may be the source of explosive mixtures?

A.—Those containing considerable oxygen with which they quite readily part, as nitrates and chlorates, and those which readily oxidize, as hypophosphites.

Q.—What is another name for pharmaceutical incompatibility?

A.—**Physical incompatibility.**

Q.—Pharmaceutical incompatibility is generally a question of what?

A.—Solvents and solubility.

Q.—Point out an example of pharmaceutical incompatibility.

A.—The mixing of tincture of ammoniated guaiac and an aqueous solution of potassium chlorate.

Q.—Explain the reason of the incompatibility.

A.—The guaiac is a resin which is soluble in alcohol, but absolutely insoluble in water, hence the ammoniated tincture is made with aromatic spirit of ammonia. The potassium chlorate is soluble in water, but not soluble in alcohol. When the mixture is made all the guaiac is thrown out of solution.

Q.—Is this a common prescription?

A.—Yes, this is found to be of much value in treating many cases of sore throat.

Q.—Can this be compounded in such manner that it will make presentable mixture?

A.—Yes.

Q.—Can precipitation be prevented?

A.—No, for the nature of the ingredients can not be changed.

Q.—What then is to be done?

A.—Cause the precipitate to be of such nature that it will not form in a sticky mass and adhere persistently to the bottom of the bottle, but of a fine flakey nature which can be easily suspended by shaking.

Q.—How may that be done?

A.—By shaking the ammoniated tincture of guaiae with an equal volume of honey, then dissolve the potassium chlorate in water and add the solution in divided portions to the tincture, shaking after each addition.

Q.—Give another example of pharmaceutical incompatibility.

A.—Mixing an alcoholic solution with a mucilage.

Q.—How is this incompatible?

A.—The gum which forms the mucilage is not soluble in alcohol, hence quickly precipitates.

Q.—What is **therapeutic incompatibility?**

A.—The prescribing of two medicines in the same prescription which are opposed to each other in therapeutic action.

Q.—Is it within the province of the pharmacist to remedy such incompatibilities?

A.—No, the physician invariably resents such assumption and there are many instances where it seems to be good practice to prescribe antagonists.

Q.—Name an official preparation in which antagonists are used.

A.—Compound acetanilide powder.

Q.—What are the therapeutic antagonists in this?

A.—Acetanilid which is a depressant and caffeine which is a stimulant.

Q.—When an incompatibility presents itself in a prescription, what is the duty of the pharmacist?

A.—He must first determine if the prescription is safe to dispense, then use his skill in compounding it in the least objectionable manner.

Q.—What books should a dispensing pharmacist always have at hand?

A.—A dispensatory which will give him much information on doses and a book on incompatibilities.

Q.—What books would you recommend?

A.—The U. S. dispensatory and Scoville's Art of Compounding or Ruddiman's Incompatibilities in Prescriptions.

Q.—Does it ever happen that a physician prescribes and really intends to give a seemingly excessive dose?

A.—Yes.

Q.—What sign or word is used to denote that the doctor is aware that the dose is large, but still wants the pharmacist to dispense it?

A.—The exclamation point (!) should follow the dose or the word "sic," meaning "so" or "let it be so."

COMPOUNDING THE PRESCRIPTION

Q.—What is the first thing to be done after receiving the prescription?

A.—Look it over to see that there is no incompatibility, then examine carefully to see that there is no error in dosage.

Q.—What is next done?

A.—Get all the material necessary to fill the prescription on the prescription case.

Q.—Why do you not take one at a time, then replace each container?

A.—Because you may find that after mixing two of the ingredients that the third one is not in stock; also all the containers should be arranged on one side of the prescription scale and as fast as used placed in regular order on the other side, so they may be checked.

Q.—How should it be checked?

A.—Let another clerk read the prescription aloud, while you follow through, making a mental confirmation of the quantities and looking at the labels on the containers.

Q.—At what time should the prescription bottle be fitted with a stopper?

A.—The very first thing after selecting the bottle, before anything at all is put into it.

Q.—Why is this necessary?

A.—If the bottle is first filled, then an attempt made to fit the stopper, the first one may not fit, then it is thrown back into the cork drawer contaminated with the contents of the bottle which may be caustic, only to be put into another bottle where the caustic cork may do great harm for it may be an eye water.

Q.—When should the label be written?

A.—This is optional, some write it before compounding the prescription, others not until the prescription is finished. If it is written first the ink has a chance to dry and there is more op-

portunity to catch any error which might be made in writing the directions.

Q.—What especial care must be used when one has two or more prescriptions to fill at the same time?

A.—To see that the labels are not accidentally changed and placed on the wrong bottles.

Q.—Has such an error been known to occur?

A.—Yes.

Q.—What is a safe plan to follow?

A.—To place the label on each prescription as soon as finished.

Q.—What further confusion is likely to occur with prescriptions?

A.—The wrong package may be given to the customer.

Q.—How may this be avoided?

A.—By having a system of checks in triplicate, one is given to the patient, one is attached to the prescription and the other attached to the package as soon as finished.

Q.—What notations should be made on the prescription when it is filed?

A.—Always, of course, the number and date of filling, then the price, if a powder to be put into capsules, whether massed or put up dry and finally the number of the capsule used.

THERAPEUTIC GROUPS

Analgesics.—Agents which relieve pain by depressing the sensory nerve centers.—Acetanilid.

Alteratives.—Agents which correct morbid conditions by changing the nutritive processes (such agents have also been called Resolvents and Discutients).—Potassium Iodide, Sarsaparilla.

Anesthetics.—Agents which cause loss of sensory nerve function and bring about insensibility.—Ether, Nitrous Oxide, Cocaine.

Anaphrodisiacs.—Agents which lessen the sexual appetite and functions.—Potassium Bromide, Monobromated Camphor.

Aphrodisiac.—Agents which stimulate the sexual appetite.—Phosphorus, Daminana.

Antisialics.—Agents which diminish the flow of saliva.—Opium, Tannic Acid.

Anthelmintics.—Agents which destroy or expel intestinal worms.—Santonin, Spigelia.

Anodynes.—Agents which allay pain.—Opium, Belladonna.

Antispasmodics.—Agents which relieve spasms of the voluntary and involuntary muscles.—Chloroform, Ether.

Astringents.—Agents which contract muscular fiber or condense other tissue.—Tannic Acid, Alum.

Antilithics.—Agents which prevent the formation of urinary and biliary concretions.—Alkaline Waters.

Anhydrotics.—Agents which check perspiration.—Belladonna, Strychnine.

Antipyretics.—Agents which reduce temperature in fever, but have no effect on normal body temperature.—Antipyrine, Quinine.

Antiperiodics.—Agents which prevent or modify the return of fever periods.—Quinine, Arsenic Trioxide.

Antiphlogistics.—Agents which reduce the inflammation of the serous membranes.—Mercury, Opium, Aconite.

Antizymotics.—Agents which arrest fermentation.—Benzoic Acid, Creosote.

Antiseptics.—Agents which prevent poisonous decomposition caused by bacilli.—Mercuric Chloride, Potassium Permanganate.

Aperients.—Agents which cause moderate evacuation of the bowels without irritation.—Manna, Sulphur.

Laxatives.—Agents which unload the bowels but not causing active purgation.—Tamarind, castor oil.

Cathartics.—Agents which produce an evacuation from the bowels. They may cause increased peristalsis or may increase the secretions of the intestinal glands.

Purgatives.—Another name for Cathartics.—Rhubarb.

Simple Purgatives.—Agents which cause active purgation, but do not cause inflammation or depression.—Senna.

Saline Cathartics.—Certain inorganic salts which produce evacuation of the bowels.—Magnesium Sulphate, Sodium Sulphate, Sodium and Potassium Tartrate.

Drastic Cathartics.—Cathartics which cause much irritation and act very powerfully.—Jalap, Bryonia.

Hydragogue Cathartics.—Cathartics which cause free, watery evacuations.—Potassium Bitartrate, Gamboge.

Cholagogue Cathartics.—Agents which stimulate the flow of bile, causing purgation of green-colored and liquid stools.—Calomel, Aloes, Podophyllin.

Antiemetics.—Agents which lessen nausea and vomiting.—Phenol, Bismuth Subnitrate, Cerium Oxalate.

Antacids.—Agents which neutralize excessive acidity of the alimentary canal.—Sodium Bicarbonate, Aromatic Spirit of Ammonia.

Cardiac Stimulants (Tonics).—Agents which increase the power of the heart or the force of the circulation.—Digitalis, Aromatic Spirit of Ammonia.

Cardiac Depressants (Sedatives).—Agents which lessen the force and frequency of the heart's action.—Aconite, Tartar Emetic.

Carminatives.—Agents which expel gas from the stomach.—The Volatile Oils, Asafetida, Ginger.

Caustics.—Agents which destroy tissue.—Caustic Potash, Zinc Chloride.

Cathartics.—See previous page.

Demulcents.—Agents which soothe and protect mucous surfaces.—Acacia, Elm.

Deodorants.—Agents which destroy foul odors.—Potassium Permanganate, Chlorinated Lime.

Diaphoretics.—Agents which cause increased secretion of sweat.—Dover's Powder, Pilocarpus.

Disinfectants.—Agents which destroy specific disease germs.—Formaldehyde, Sulphur Dioxide.

Diuretics.—Agents which cause an increased flow of urine.—Potassium Acetate, Broom.

Digestants.—Agents which aid digestion of food.—Pepsin, Pancreatin.

Emetics.—Agents which cause vomiting.—Ipecac, Tartar Emetic.

Emollients.—Agents which cause softening of the skin and relax tissues.—Petrolatum, Cacao Butter.

Ecbolics.—Agents which may cause abortion.—Ergot, Potassium Permanganate.

Emmenagogues.—Agents which reestablish or increase the menstrual flow.—Cantharides, Ferrous Sulphate.

Epispastics.—Agents which when applied to the skin cause blisters to form.—Cantharides, Iodine.

Escharotics.—Same as Caustics, which see.

Expectorants.—Agents which modify and cause the expulsion of the secretions of the air passages:

Sedative Expectorants.—Ipecac, Tartar Emetic.

Stimulating Expectorants.—Ammonium Carbonate, Senega.

Febrifuges.—Same as antipyretics, which see.

Galactagogues.—Agents which increase the flow of milk.—Pilocarpus.

Gastric Sedatives.—Agents which allay gastric irritation thus allaying nausea and vomiting.—Calomel, Lime Water.

Hæmostatics.—Agents which allay internal hemorrhage.—Ergot, Gallic Acid, Lead Acetate.

Hypnotics.—Agents which induce sleep.—Chloral Hydrate, Trional.

Hæmatics or Hæmatinics.—Agents which increase the red corpuscles of the blood.—Ferrous Carbonate.

Irritants.—Agents which cause inflammation of the part to which they are applied (sometimes spoken of as Counter-Irritants).—Mustard, Capsicum, Iodine.

Lithotriptics.—Agents which dissolve urinary or biliary concretions.—Ammonium Benzoate, Carbonated Waters, Lithium Citrate.

Motor Depressants.—Agents which depress the functions of the spinal cord, motor nerves or muscles.—Physostigma, Sodium Nitrite.

Motor Excitants.—Agents which increase the functional activity of the spinal cord and excite muscular action.—Nux Vomica, Ignatia.

Mydriatics.—Agents which cause dilation of the pupil.—Belladonna, Homatropine.

Myotics.—Agents which contract the pupil.—Physostigmine, Pilocarpine.

Narcotics.—Agents which produce stupor-like sleep.—Opium, Cannabis.

Oxytocics.—Same as Ecbolics, which see.

Parasiticides.—Agents which destroy animal or vegetable parasites.—Sulphur, Mercuric Nitrate, Staphisagria.

Protectives.—Coverings applied locally to protect parts from light, air, friction or other injurious influence.

Pustulants.—Agents which cause powerful irritation of the skin, particularly the sweat glands, producing a crop of pustules.—Croton Oil, Silver Nitrate.

Purgatives.—See under Aperients.

Refrigerants.—Agents which allay thirst and give a sensation of coolness to the system.—Diluted mineral or vegetable acids, Solution of Ammonium Acetate.

Rubefacients.—Agents which produce redness of the skin because of slight irritation.—Iodine, Oil of Turpentine.

Resolvents.—See Alteratives.

Sedatives.—Agents which allay excitement and soothe the system:

Cerebral Sedatives.—Morphine, Opium.
Nerve Sedatives.—Potassium Bromide, Valerian.
Cardiac Sedatives.—Aconite, Tartar Emetic.
Gastric Sedatives.—Bismuth Subnitrate, Cerium Oxalate.
Pulmonary Sedatives.—Codeine, Hydrocyanic Acid.
Respiratory Sedatives.—Veratrum, Aconite.

Sialagogues.—Agents which cause an increased flow of saliva.—Ginger, Mercurials.

Somnificants.—See Hypnotics.

Soporifics.—See Hypnotics.

Sternutatories.—Agents which cause sneezing.—Tartaric Acid, Pyrethreum.

Stimulants.—Agents which excite special portions of the body.—Alcohol, Caffeine.

Styptics.—Agents which stop the flow of blood when applied locally.—Alum, Ferric Subsulphate.

Sudorifics.—See Diaphoretics.

Tænifuges.—Agents which expel tapeworms.—Aspidium, Pepo.

Tonics.—Agents which restore strength and energy to a debilitated system.—Gentian, Iron.

Vermicides.—Agents which kill intestinal worms.—Jalap, Ferrous Sulphate.

Vermifuges.—Agents which expel intestinal worms.—Castor Oil, Scammony.

Vesicants.—Agents which when applied to the skin raise blisters.—Cantharides, Stronger Ammonia Water.

INDEX

*Latin names are listed alphabetically immediately following the English.

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